

# Accessory Design Guidelines for Apple Devices

Release R1

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# 1. Introduction

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**Note:** These Accessory Design Guidelines for Apple Devices ('Guidelines') are subject to the terms and conditions set forth on the final page of this document. By downloading, accessing, or otherwise utilizing these Guidelines, you agree to be bound by, and only utilize the Guidelines in accordance with, such terms and conditions.

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## 1.1 Purpose of This Specification

These guidelines address the physical design of cases, covers, screen overlays, and camera attachments for Apple devices.

These guidelines do not address how accessories communicate with Apple devices. Instead, see:

- MFi Program (<https://developer.apple.com/programs/mfi/>)
- Bluetooth Accessory Design Guidelines for Apple Products (<https://developer.apple.com/bluetooth/>)

## 1.2 Requirements, Recommendations, and Permissions

This specification contains statements that are incorporated by reference into legal agreements between Apple and its licensees. The use of the words *must*, *must not*, *required*, *shall*, *shall not*, *should*, *should not*, *recommended*, *not recommended*, *may*, *optional*, and *deprecated* in a statement have the following meanings:

- *must*, *shall*, or *required* means the statement is an absolute requirement.
- *must not*, *shall not* or *prohibited* means the statement is an absolute prohibition.
- *should* or *recommended* means the full implications must be understood before choosing a different course.
- *should not* or *not recommended* means the full implications must be understood before choosing this course.
- *may* or *optional* means the statement is truly optional, and its presence or absence cannot be assumed.
- *deprecated* means the statement is provided for historical purposes only and is equivalent to 'must not'.

The absence of requirements, recommendations, or permissions for a specific accessory design in this specification must not be interpreted as implied approval of that design. Developers are strongly encouraged to ask Apple for feedback on accessory designs that are not explicitly mentioned in this specification.

## 1.3 Terminology

### 1.3.1 Accessory, Device, and Product

Throughout this specification:

- The term *device* is used to refer to:
  - An Apple iPhone, iPad, or iPod (typically running iOS, Apple's mobile operating system).
  - An Apple Watch (typically running watchOS, Apple's watch operating system).
  - An Apple TV (typically running tvOS, Apple's television operating system).
- The term *accessory* is used to refer to any product intended to interface with a *device* via the means described in this specification.
- The term Apple *product* is used to refer generically to either a Mac (Apple computers that run macOS or OS X) or to an aforementioned *device*.

Statements that explicitly mention iOS, watchOS, tvOS, or macOS / OS X apply only to products running those operating systems.

## 2. All Accessories

The requirements in this section apply to all accessories regardless of their feature sets.

### 2.1 Attachments

Accessories must remain compliant with the specification when connected to any attachments designed for that accessory.

Examples of accessory attachments include, but are not limited to:

- Car or desk mounts for a case accessory.
- Wireless charging mats for a dongle or case accessory.
- Detachable barcode scanners/credit card readers for a dock accessory.

### 2.2 Magnetic Interference

Apple recommends avoiding the use of magnets and metal components in accessories.

All accessories that claim to be compatible with Apple devices that contain a digital compass (magnetometer) must minimize interference with the digital compass and must not repeatedly trigger compass recalibration.

Additionally, iPhone 7 Plus, iPhone 7, iPhone 6s Plus and iPhone 6 Plus have an autofocus rear camera equipped with optical image stabilization (OIS) that may be affected by magnets and metal components in accessories. Accessories that claim compatibility with these Apple devices must not affect the operation of the autofocus rear camera.

### 2.3 Radio Frequency (RF) Performance

This section contains RF performance requirements and recommendations for all accessories.

#### 2.3.1 Materials and Coatings

Accessories should avoid use of:

- Metals
- Conductive materials or coatings
- Materials with high dielectric (permittivity  $>5$  F/m)

Such materials absorb radio frequency energy and may impair or degrade the performance of antennas for cellular communication, GPS, Wi-Fi, Bluetooth, and NFC.

Examples include (but are not limited to) the following:

- Steel, aluminum, magnesium, titanium, etc.
- Plastics with any carbon content
- Plastics with any glass content
- Plastics with metallic plating
- Metallic paints
- Black paints with high carbon loading
- White paints with high titanium dioxide loading
- Metallic Physical Vapor Deposition (PVD) coatings

#### 2.3.2 Antenna Keep-Out

Antenna keep-out regions (also labeled as "No Metal Contact") can be found in the device dimensional drawings, see [Device Dimensional Drawings](#) (page 36).

Accessory materials or coatings that absorb radio frequency energy (see [Materials and Coatings](#) (page 11)) in the antenna keep-out region have a higher risk of degrading Apple device wireless performance.

#### 2.3.3 Over The Air (OTA)

Accessories must not excessively degrade the Apple device's RF transmission efficiency. This can be quantified by measuring Total Radiated Power (TRP) across all of the device's operating bands.

Accessories must not excessively degrade the Apple device's RF reception sensitivity. This can be quantified by measuring Effective Isotropic Sensitivity (EIS) across all of the device's operating bands.

Accessories may have a higher risk of excessively degrading Apple device RF performance if they:

- Contain magnets.
- Intrude on Apple device antenna keep-out zones (see [Antenna Keep-Out](#) (page 12)).



### 2.3.4 Near Field Communication (NFC)

Accessories that intrude on Apple device antenna keep-out zones (see [Antenna Keep-Out](#) (page 12)) and claim compatibility with NFC enabled Apple devices must not degrade device NFC transaction performance.

The following Apple devices are NFC enabled:

- iPhone 7 Plus
- iPhone 7
- iPhone SE
- iPhone 6s Plus
- iPhone 6s
- iPhone 6 Plus
- iPhone 6

## 3. Cases

Accessories that substantially enclose Apple devices must comply with the requirements stated in this chapter unless the accessory supports other features in this specification whose requirements conflict with the requirements in this chapter.

If the accessory has multiple user-detachable components that substantially enclose the Apple device, the requirements and/or overrides must be applied to each component separately.

### 3.1 Product Design

A well-designed case will securely house an Apple device while not interfering with the device's operation. Significant factors in mechanical design include access to the device's sensors, controls, and connectors. Dimensional drawings for all Apple devices can be found in [Device Dimensional Drawings](#) (page 36).

#### 3.1.1 Device Protection

Cases must protect the Apple device from a 1 m drop onto a hard paved surface in any device orientation.

Specifically, exposed glass on the Apple device must not come within 1 mm of a flat surface, such as a table or floor, in any orientation when the case is attached. This may be achieved by either covering the exposed glass or creating features around it that will space the exposed glass at least 1 mm away from the flat surface.

#### 3.1.2 Access to Inputs and Interconnects

The accessory must readily permit the user to access inputs and interconnects.

##### 3.1.2.1 Access to Controls

The accessory must readily permit the user to access and operate the device's mechanical controls such as, but not limited to:

- Volume
- Ring/Silent controls
- Sleep/Wake control
- Home button

### 3.1.2.2 Access to the Headset Jack and 30-pin or Lightning Connector

The accessory must provide ready access to an Apple device's headset jack. The headset jack opening (i.e., keep-out area) must be at least 6.0 mm in diameter and at most 14.0 mm deep. At least 6.5 mm in diameter and at most 10.0 mm deep is recommended for best compatibility with a range of headsets.

The accessory must also provide unobstructed access to either the 30-pin connector or the Lightning connector.

If the accessory is for an Apple device with the Lightning connector, the opening (i.e., keep-out area) must be at least 12.05 mm by 6.30 mm with full radii rounded edges. 13.65 mm by 6.85 mm is recommended for best compatibility with a range of cables and docks.

In addition, the headset jack and 30-pin or Lightning connector openings must be designed with enough margin to compensate for shifting or dimensional changes of the accessory material.

### 3.1.2.3 Access to the Smart Connector

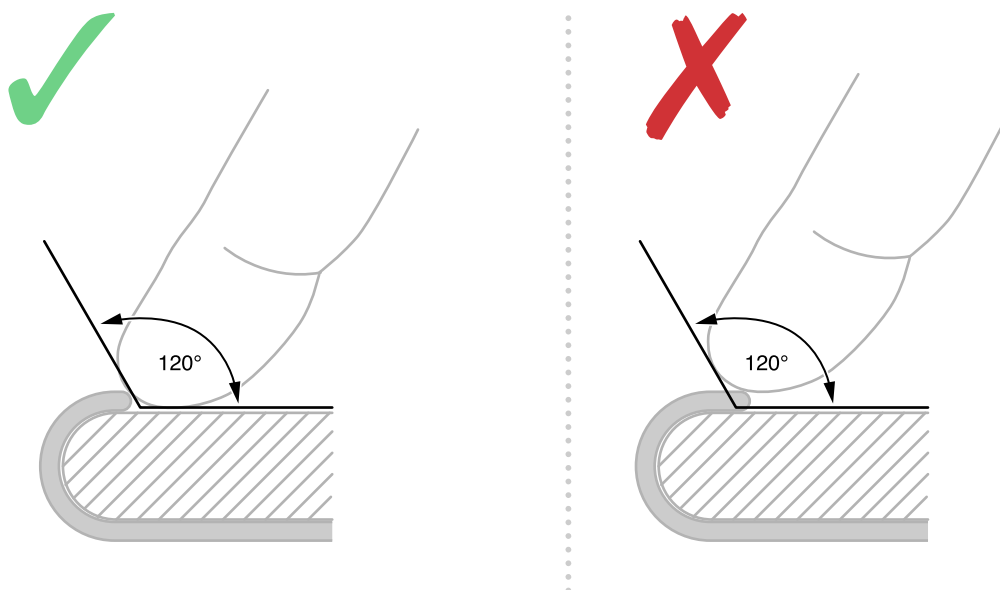
Accessories that do not make use of the Smart Connector must not expose it.

### 3.1.2.4 Touchscreen

The accessory should not have any edges that can collect water on the touch screen area when the Apple device is held at a 30° angle relative to the horizon.

Accessories must allow a 120° opening along the edges of the active area of the touchscreen to ensure compatibility with the Apple device touchscreen features. See [Figure 3-1](#) (page 15) for more information on the keep-out and [Device Dimensional Drawings](#) (page 36) device specific active display areas.

Figure 3-1 Touchscreen keep-out area



### 3.1.2.5 Cover Glass Contact

Cases that claim compatibility with the following Apple devices should not contact the cover glass as defined in their dimensional drawings:

- iPhone 7 Plus
- iPhone 7
- iPhone 6s Plus
- iPhone 6s
- iPhone 6 Plus
- iPhone 6

See [Device Dimensional Drawings](#) (page 36).

### 3.1.3 Dock Compatibility

For compatibility with docks, the distance from bottom of the Apple device to the outside of a case should not exceed 1.8 mm.

## 3.2 Acoustics

The accessory must not impair or degrade the acoustic performance of an Apple device.

### 3.2.1 Call Quality

The accessory must not impair or degrade the user's experience making and receiving both audio calls over a cellular network or audio/video calls using FaceTime in both handset and speakerphone modes. The accessory should not change the frequency response of the speakers or microphones. In addition, the user should not hear any distortion or echo resulting from the accessory.

If the accessory includes a cover or other flap that can be folded over the microphone, the accessory must provide access to the microphone in at least one accessory configuration where the microphone is not occluded.

### 3.2.2 Speaker to Microphone Coupling

Cases must not facilitate the conduction of sound from the speaker to any microphone. Such sound conduction may cause echoing in phone calls.

### 3.2.3 Speaker/Microphone Openings

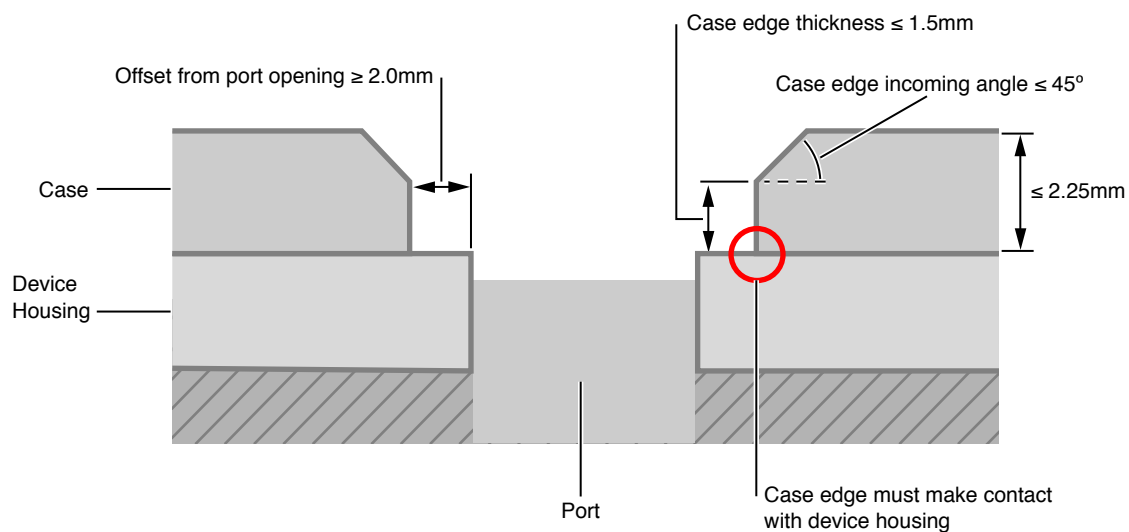
Apple device speaker/microphone port locations vary from model to model, see [Device Dimensional Drawings](#) (page 36).

#### 3.2.3.1 Thin Cases ( $\leq 2.25$ mm)

Microphone/speaker openings in thin cases should:

- Be offset at least 2.0 mm from the edge of any Apple device speaker/microphone port.
- Be at most 1.5 mm thick along their inner diameter.
- Have a maximum 45° incoming angle to their inner diameter.
- Maintain a proper seal against the Apple device between speaker/microphone ports.

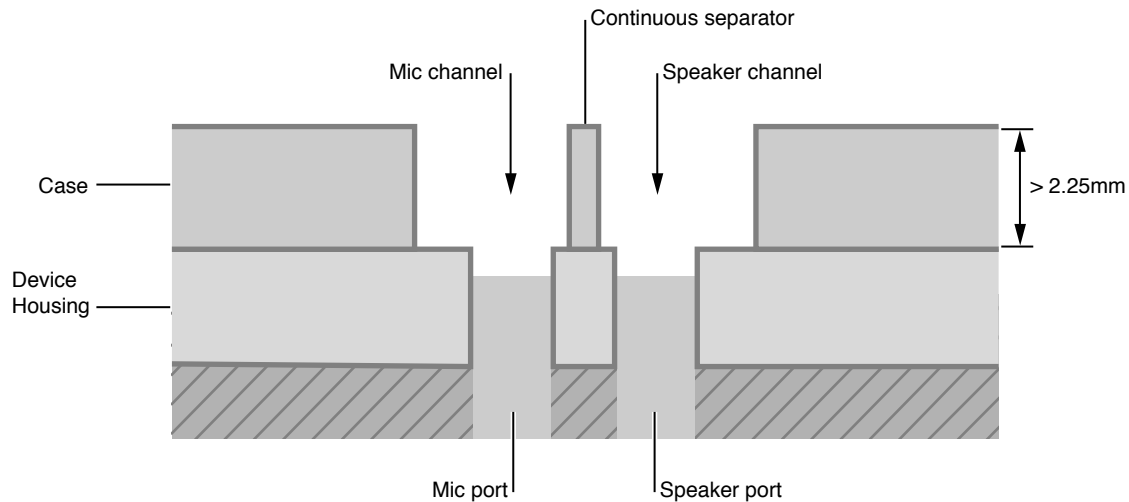
**Figure 3-2** Microphone/speaker opening recommendations for thin cases



#### 3.2.3.2 Thick Cases ( $> 2.25$ mm)

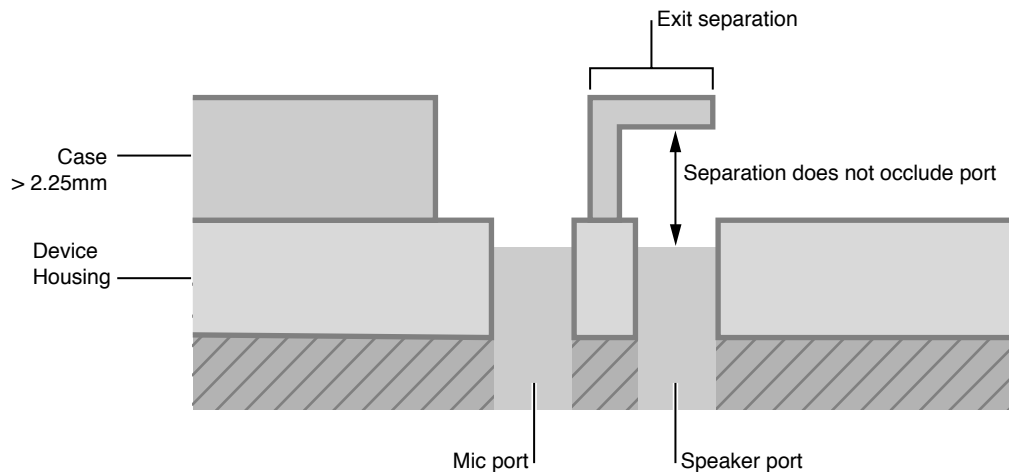
Speaker and microphone openings should be channeled independently and without interruption to/from the outside surface of a thick case.

**Figure 3-3** Thick case acoustic channels



Thick cases should maximize exit separation between speaker and microphone channels.

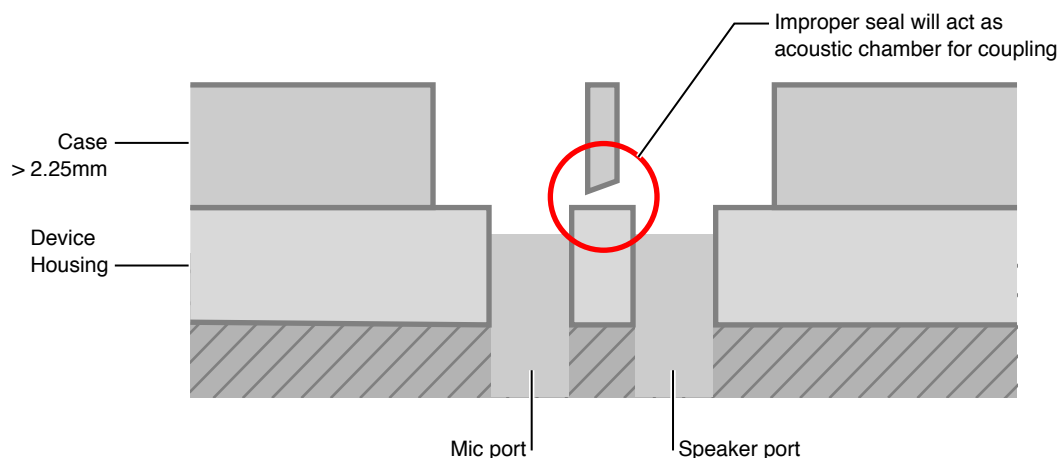
**Figure 3-4** Thick case microphone and speaker exit separation



Thick case channels may act as a resonant chamber and detune microphone/speaker frequency response. The resulting frequency response may vary according to channel size/shape.

If a thick case does not maintain a proper seal against the Apple device between microphone/speaker channels, the case itself may become an acoustic chamber.

Figure 3-5 Improper thick case seal



### 3.3 Ambient Light Sensor and Proximity Sensor Interference

The ambient light sensor and proximity sensor locations for various Apple devices are shown in the dimensional drawings cited in [Device Dimensional Drawings](#) (page 36). Some of the dimensional drawings specify a recommended keep-out area around these sensors. No material must be allowed to cover these sensors or their keep-out areas, this includes films and privacy screens. Accessories that allow the Apple device to slide around must not obstruct any sensors.

### 3.4 Taptic Engine

Accessories should not cause substantial change in the feel of the Apple device's Taptic Engine.

The following Apple devices contain a Taptic Engine:

- iPhone 7 Plus
- iPhone 7
- iPhone 6s Plus
- iPhone 6s

### 3.5 Magnetic Interference

Cases must not interfere with the Apple device's magnetic compass or rear camera OIS feature if present.

See [Magnetic Interference](#) (page 11) for additional details.

## 3.6 Home Button

Accessories must not inhibit use of the Apple device's Home Button including features such as Touch ID fingerprint recognition.

Home Button keep-outs for Apple devices can be found in [Device Dimensional Drawings](#) (page 36).

Additionally, accessories that overlay the iPhone 7 and iPhone 7 Plus Home Button may cause users to have difficulty using the Home Button.

## 3.7 Camera

The field of view (FOV) of the camera and the illumination provided by the flash are designed for each Apple product camera. It is imperative that manufacturers consult technical specifications released for each product and do not assume these parameters are shared between products.

Images from the camera may be affected by the geometry, color, and surface finish of the accessory openings for camera and applicable flash.

### 3.7.1 Geometry

The camera lens FOV must not be blocked. Making the accessory opening too small around the camera and flash may block the FOV of the lens and the illumination from the flash. Blocking the FOV may cause vignetting in the image, where one or more corners of the image reproduced are darker than the center. Blocking marginal rays just outside the FOV of the lens may also reduce the sharpness and contrast of the image. Blocking the illumination from the flash may cause haze in the image, which resulting in reduced contrast. See [Device Dimensional Drawings](#) (page 36) for the camera keep-out.

The accessory opening must not be designed in a way that directs stray light into the camera. If the opening is too narrow or too steep, it may reflect light into the camera, washing out the image or adding an unwanted color cast. Adding a chamfer to the accessory opening trim may help to direct stray light away from the camera. Additionally, where the product is equipped with a flash, a narrow or steep opening may reflect light from the accessory opening back into the camera. This may cause the image to appear washed out or contain unwanted artifacts. Designers should ensure that the mechanical keep-outs outlined in the device dimensional drawings ([Device Dimensional Drawings](#) (page 36)) are maintained with worst-case X-Y placement tolerances to minimize the risk of haze.



### 3.7.2 Color

Any light reflected from the accessory may pick up the color of the accessory. Black material or black coating may help avoid color bleeding into the camera from an external light source or the flash. The darker the color, the less light may be reflected from the source into the camera.

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**Note:** Apple recommends a semi-gloss black material or coating around the camera and flash opening.

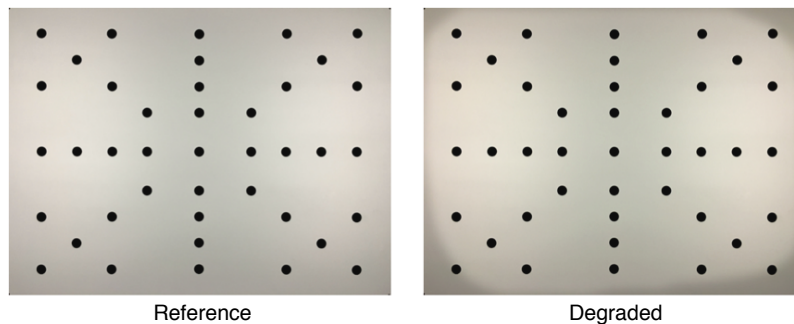
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### 3.7.3 Surface Finish

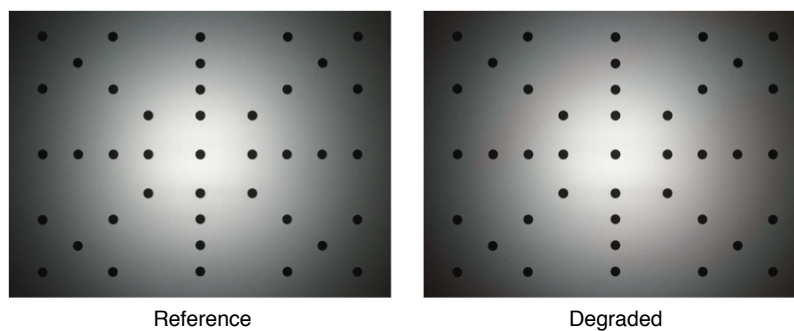
The flash is a strong source of light and reflections from the camera accessory opening trim should be managed so that they do not reflect back into the camera. Semi-gloss material may direct light away from the camera. Matte or diffuse materials scatter light in all directions and will increase the likelihood that light from the flash or strong light sources in the scene is reflected into the camera.

### 3.7.4 Image Degradation Examples

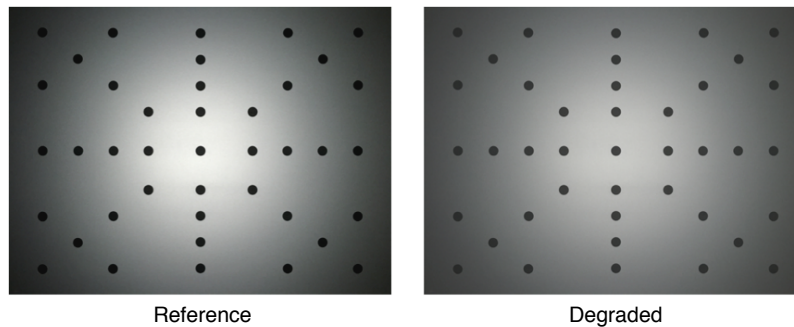
**Figure 3-6** Sample image degradation by image blocking in ambient condition



**Figure 3-7** Sample image degradation by color shift through accessory with strong color



**Figure 3-8** Sample image degradation by flash interference



## 3.8 Reliability

Cases for Apple devices must be tested to verify that they will withstand long-term use under typical use conditions, and that they do not impair or degrade the functionality of the device, damage it or its immediate surroundings, or adversely affect the user.

### 3.8.1 Device Insertion and Removal

The case must hold the Apple device securely while permitting its easy insertion and removal. The case and the enclosed device must not be damaged by the repeated insertion and removal of the device from the case under conditions representative of long-term use in a variety of environments.

### 3.8.2 Colorfastness

Any dyes, inks, or coatings in or on the case must not bleed color onto either the device or its user, particularly while the case is in contact with common substances such as water or sunscreen.

## 3.9 Environmental

Accessories for Apple devices must comply with applicable environmental regulations in the regions in which such accessories are to be sold, and any applicable substance or material restrictions, including applicable restrictions on the following substances:

- Organic tin compounds, PFOS, PFOA, phthalates, azo dyes, polybrominated biphenyls (PBBs) and PAHs, per requirements of the EU REACH regulation EC 1907/2006
- Nickel leach rate on surfaces in prolonged skin contact, per requirements of the EU REACH regulation EC 1907/2006
- Cadmium, lead, hexavalent chromium, and nickel, per requirements of EU Directive 2009/48/EC

- Natural rubber latex, per requirements of EU Directive EC 93/42/EEC
- Dimethylfumarate (DMFu), per requirements of EU Regulation 412/2012
- pH and Formaldehyde, per requirements of China GB 18401 for textiles and China GB 20400 for leather
- Endangered species of flora and fauna in products or packaging (US Lacey Act)
- Polybrominated diphenyl ethers (PBDE)

## 3.10 Test Procedures

### 3.10.1 Required Apple Device Models

Case testing procedures vary depending on the Apple device they enclose.

#### 3.10.1.1 iPhone 7 Plus

**Table 3-1** iPhone 7 Plus Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPhone 7 Plus	
<a href="#">Home Button Overlays</a> (page 30)	iPhone 7 Plus	

#### 3.10.1.2 iPhone 7

**Table 3-2** iPhone 7 Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPhone 7	
<a href="#">Home Button Overlays</a> (page 30)	iPhone 7	

#### 3.10.1.3 iPhone 6s Plus/iPhone 6 Plus

**Table 3-3** iPhone 6s Plus/iPhone 6 Plus Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPhone 6s Plus and iPhone 6 Plus	

It is not possible for a case to claim compatibility with only the iPhone 6s Plus or only the iPhone 6 Plus.

#### 3.10.1.4 iPhone 6s/iPhone 6

**Table 3-4** iPhone 6s/iPhone 6 Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPhone 6s and iPhone 6	

It is not possible for a case to claim compatibility with only the iPhone 6s or only the iPhone 6.

#### 3.10.1.5 iPhone 5/iPhone 5s/iPhone SE

**Table 3-5** iPhone 5/iPhone 5s/iPhone SE Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPhone SE	

It is not possible for a case to claim compatibility with only the iPhone 5 or only the iPhone 5s or only the iPhone SE.

#### 3.10.1.6 iPhone 5c

**Table 3-6** iPhone 5c Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPhone 5c	

#### 3.10.1.7 iPad Pro (9.7-inch)

**Table 3-7** iPad Pro (9.7-inch) Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPad Pro (9.7-inch)	

### 3.10.1.8 iPad Pro (12.9-inch)

**Table 3-8** iPad Pro (12.9-inch) Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPad Pro (12.9-inch)	

### 3.10.1.9 iPad mini 4

**Table 3-9** iPad mini 4 Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPad mini 4	

### 3.10.1.10 iPad mini/iPad mini 2/iPad mini 3

**Table 3-10** iPad mini/iPad mini 2/iPad mini 3 Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPad mini 3	

It is not possible for a case to claim compatibility with only the iPad mini or only the iPad mini 2 or only the iPad mini 3.

### 3.10.1.11 iPad Air 2

**Table 3-11** iPad Air 2 Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPad Air 2	

### 3.10.1.12 iPad Air

**Table 3-12** iPad Air Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPad Air	

### 3.10.1.13 iPad (4th generation)

**Table 3-13** iPad (4th generation) Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPad (4th generation)	

### 3.10.1.14 iPod touch (5th generation)/iPod touch (6th generation)

**Table 3-14** iPod touch (5th generation)/iPod touch (6th generation) Case Testing Matrix

Test	Using	Notes
<a href="#">Product Design</a> (page 26)	iPod touch (6th generation)	

It is not possible for a case to claim compatibility with only the iPod touch (5th generation) or only the iPod touch (6th generation).

## 3.10.2 Product Design

### 3.10.2.1 Equipment

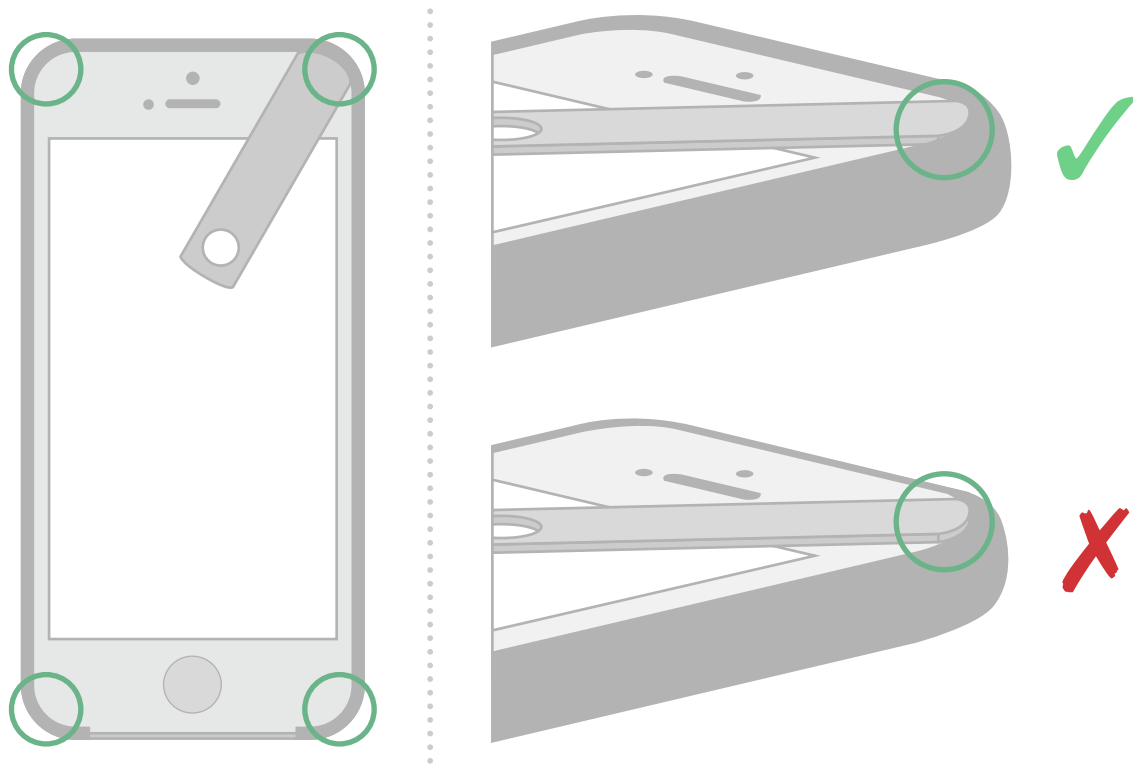
- Apple device.
- Apple Lightning Digital AV Adapter
- Apple 30-pin to USB Cable
- Vernier calipers
- 0.85 mm plastic feeler gauge
- EarPods with 3.5 mm Headphone Plug
- Touchscreen test block (provided by Apple)

### 3.10.2.2 Procedure

1. Insert the Apple device into the case.
2. Verify that the Apple device completely fits inside the case. The Apple device must not be loose.
3. Verify that all buttons are accessible.
4. Inspect for button feel. The buttons must not be too hard to press or take a lot of effort to press.
5. For Apple devices that have an Apple Lightning connector:
  - a. Insert the Apple Lightning Digital AV Adapter into the Lightning receptacle and verify that it fits.
  - b. Using vernier calipers, measure the Lightning connector opening on the case. Verify that the opening is measured to be at least 12.05 mm by 6.30 mm.
6. For Apple devices that have an Apple 30-pin connector:
  - a. Insert the Apple 30-pin to USB Cable into the 30-pin receptacle and verify that it fits.
  - b. Using vernier calipers, measure the 30-pin connector opening on the case. Verify that the opening is measured to be at least 22.1 mm by 2.8 mm.
7. For Apple devices that have a 3.5 mm headset jack:
  - a. Insert EarPods with 3.5 mm Headphone Plug into the headset jack of the Apple device and verify it fits.
  - b. Using vernier calipers, measure the headset jack opening on the case. Verify that the opening is measured to be at least 6 mm in diameter and no more than 14 mm deep.
8. For Apple devices with Touch ID, use vernier calipers to verify that the case is at least 2 mm away from the Touch ID sensor.

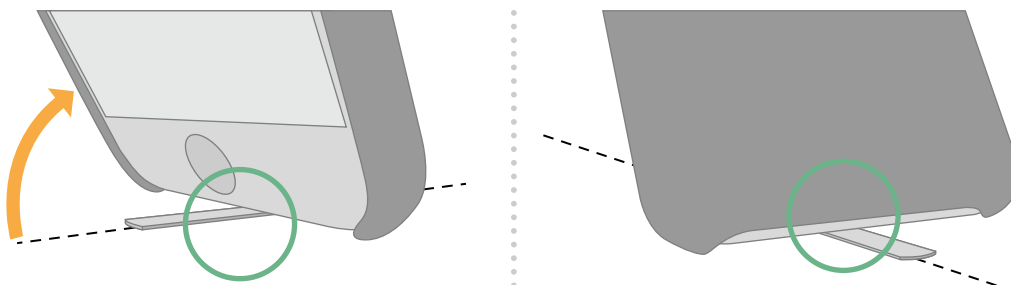
9. Verify that the case is always proud of the feeler gauge when the gauge is placed at each corner of the Apple device. See [Figure 3-9](#) (page 28).

**Figure 3-9** Apple device proudness test



10. Set the Apple device flat on its face (screen facing down).
11. Roll the device towards any side that is not enclosed by the case until the gap between the Apple device's exposed glass and flat surface is smallest.
12. Verify that the feeler gauge fits into the gap between the Apple device's exposed glass and flat surface.

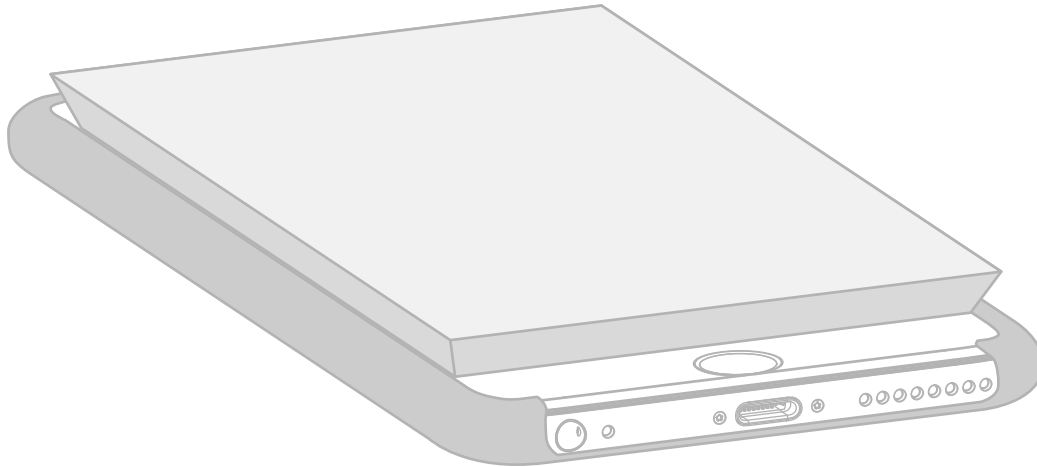
**Figure 3-10** Apple device gap test





13. Place the touchscreen test block onto the touchscreen of the Apple device. Verify the test block is sitting flush on the touchscreen.

**Figure 3-11** Apple device touchscreen keep-out test



14. If the case has an overlay, verify that there are no air gaps introduced between it and the touchscreen.

## 3.10.3 Taptic Engine

### 3.10.3.1 Equipment

- Two Apple devices A and B, same model
- Table

### 3.10.3.2 Procedure

1. Attach the case to Apple device B
2. Place Apple device A on top of the table.
3. Place Apple device B on top of the table next to Apple device A.
4. Compare the Taptic Engine feedback between Apple device A and Apple device B for each of the following tasks:
  - a. Go to: Settings -> Sound, set "Vibrate on Silent" to the on position.
  - b. Toggle the Ring/Silent switch.
  - c. Connect a charger to both Apple devices.
  - d. Go to: Settings -> Notifications -> Phone -> Sounds, select Opening (Default).
  - e. Go to: Settings -> Notifications -> Messages -> Sounds, select Note (Default).
  - f. Trigger a Quick Actions menu by applying pressure to the Settings app. Continue applying pressure.

- g. Slide your finger across the Quick Actions menu and release when Wi-Fi is selected.
  - h. Apply pressure to the Home app.
  - i. Go to: Clock app and select Timer on the bottom right.
  - j. Scroll through the hour and minutes.
  - k. Go to: Settings -> General -> Home Button, tap option 2.
  - l. Press the Home button.
5. Repeat the above tasks while holding Apple device A in the left hand and Apple device B in the right hand.

### 3.10.3.3 Pass/Fail Criteria

The case does not cause substantial change in the feel of the Apple device's Taptic Engine.

## 3.10.4 Home Button Overlays

This test procedure is applicable to all iPhone 7 or iPhone 7 Plus accessories that overlay the Home Button.

### 3.10.4.1 Equipment

- Nitrile gloves (e.g. Ansell TNT Blue)
- Ethyl alcohol hand sanitizer (e.g. Purell)
- Scissors

### 3.10.4.2 Procedure

1. Cut off a square of material from the nitrile glove's wrist portion.
2. Install the accessory onto the Apple device.
3. Press the sleep/wake button to place the Apple device into a sleep state (display off).
4. Place the square of nitrile glove material over the Apple device's home button with the glove's outer side facing away from the Apple device.
5. Apply a small amount of hand sanitizer (approximately dime-sized) to the nitrile over the home button.
6. Repeat the following steps 10 times:
  - a. Press the home button with a thumb.
  - b. Verify that the Apple device wakes (display on).
  - c. Press the sleep/wake button to place the Apple device into a sleep state (display off).
7. Repeat the following steps 10 times:
  - a. Press the home button with an index finger.

- b. Verify that the Apple device wakes (display on).
- c. Press the sleep/wake button to place the Apple device into a sleep state (display off).

#### 3.10.4.3 Pass/Fail Criteria

The Apple device must wake every time the home button is pressed.

## 4. Covers

This chapter is applicable to accessories that cover Apple device displays.

### 4.1 Magnetic Interference

Accessory covers must not interfere with the Apple device's magnetic compass or rear camera OIS feature if present.

See [Magnetic Interference](#) (page 11) for additional details.

### 4.2 Smart Covers

Dimensional drawings indicating magnet and Hall effect sensor locations are available for the following Apple devices:

- [iPad Pro \(9.7-inch\) Magnet and Hall Effect Sensor Locations](#) (page 55)
- [iPad Pro \(12.9-inch\) Magnet and Hall Effect Sensor Locations](#) (page 59)

## 5. Screen Overlays

The touch interface in an Apple device senses the presence of one or more fingers on its surface. Any material between the surface and the user's hand, even a very thin sheet of plastic, may affect the performance of the touch interface.

### 5.1 Product Design

Screen overlay thickness must not exceed:

- 0.1 mm for iPad Pro (9.7-inch) and iPad Pro (12.9-inch).
- 0.3 mm for all other Apple devices.

Additionally, screen overlays must not:

- Introduce air gaps between the touchscreen and overlay.
- Be electrically conductive.

### 5.2 Edge Swipe Gestures

Users must be able to easily use iOS edge swipe gestures even if a screen overlay is present.

Examples of such gestures include, but are not limited to:

- Bringing up Control Center or Notification Center.
- Swiping 'back' from apps that use edge swipe gestures such as Messages.

### 5.3 Edge Press Gestures

Users must be able to easily use iOS edge press gestures even if a screen overlay is present. Apple devices that support the 3D Touch feature such as iPhone 7 Plus, iPhone 7, iPhone 6s Plus or iPhone 6s are all capable of edge press gestures.

An edge press gesture is used to bring up the task switcher in iOS 9.0 and later.

## 6. Camera Attachments

This chapter is applicable to accessories that intentionally alter the images captured by Apple device cameras.

### 6.1 Magnetic Interference

Accessory camera attachments must not interfere with the Apple device's magnetic compass or rear camera OIS feature if present.

See [Magnetic Interference](#) (page 11) for additional details.

# 7. Device Dimensional Drawings

This chapter contains the following dimensional drawings:

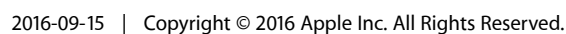
- [iPhone 7 Plus](#) (page 39)
- [iPhone 7](#) (page 40)
- [iPhone 6s Plus](#) (page 41)
- [iPhone 6s](#) (page 42)
- [iPhone 6 Plus](#) (page 43)
- [iPhone 6](#) (page 44)
- [iPhone 5s & iPhone SE](#) (page 45)
- [iPhone 5c](#) (page 46)
- [iPhone 5](#) (page 47)
- [iPhone 4s](#) (page 48)
- [iPhone 4 \(CDMA model\)](#) (page 49)
- [iPhone 4 \(GSM model\)](#) (page 50)
- [iPhone 3G and iPhone 3GS](#) (page 51)
- [iPhone](#) (page 52)
- [iPad Pro \(9.7-inch\) with Wi-Fi](#) (page 53)
- [iPad Pro \(9.7-inch\) with Wi-Fi + Cellular](#) (page 54)
- [iPad Pro \(9.7-inch\) Magnet and Hall Effect Sensor Locations](#) (page 55)
- [iPad Pro \(12.9-inch\) with Wi-Fi](#) (page 57)
- [iPad Pro \(12.9-inch\) with Wi-Fi + Cellular](#) (page 58)
- [iPad Pro \(12.9-inch\) Magnet and Hall Effect Sensor Locations](#) (page 59)
- [iPad mini 4 with Wi-Fi](#) (page 61)
- [iPad mini 4 with Wi-Fi + Cellular](#) (page 62)
- [iPad mini 4 Magnet and Hall Effect Sensor Locations](#) (page 63)
- [iPad Air 2 with Wi-Fi](#) (page 64)
- [iPad Air 2 with Wi-Fi + Cellular](#) (page 65)



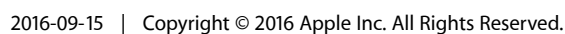
- [iPad mini 2 & iPad mini 3 with Wi-Fi](#) (page 66)
- [iPad mini 2 & iPad mini 3 with Wi-Fi + Cellular](#) (page 67)
- [iPad Air with Wi-Fi](#) (page 68)
- [iPad Air with Wi-Fi + Cellular](#) (page 69)
- [iPad mini with Wi-Fi](#) (page 70)
- [iPad mini with Wi-Fi + Cellular](#) (page 71)
- [iPad \(4th generation\) with Wi-Fi](#) (page 72)
- [iPad \(4th generation\) with Wi-Fi + Cellular](#) (page 73)
- [iPad \(3rd generation\) with Wi-Fi](#) (page 74)
- [iPad \(3rd generation\) Wi-Fi + 4G](#) (page 75)
- [iPad 2 with Wi-Fi](#) (page 76)
- [iPad 2 with Wi-Fi + 3G](#) (page 77)
- [iPad with Wi-Fi](#) (page 78)
- [iPad with Wi-Fi + 3G](#) (page 79)
- [iPod touch \(6th generation\)](#) (page 80)
- [iPod touch \(5th generation\)](#) (page 81)
- [iPod touch \(4th generation\)](#) (page 82)
- [iPod touch \(3rd generation\)](#) (page 83)
- [iPod touch \(2nd generation\)](#) (page 84)
- [iPod touch](#) (page 85)
- [iPod nano \(7th generation\)](#) (page 86)
- [iPod nano \(6th generation\)](#) (page 87)
- [iPod nano \(5th generation\)](#) (page 88)
- [iPod nano \(4th generation\)](#) (page 89)
- [iPod nano \(3rd generation\)](#) (page 90)
- [iPod nano \(2nd generation\)](#) (page 91)
- [iPod nano](#) (page 92)
- [iPod classic 160GB](#) (page 93)
- [iPod classic 80GB](#) (page 94)
- [iPod \(5th generation\) 60GB/80GB](#) (page 95)
- [iPod \(5th generation\) 30GB](#) (page 96)

- [iPod \(4th generation\)](#) (page 97)
- [iPod \(3rd generation\)](#) (page 98)
- [iPod photo 30GB/60GB](#) (page 99)
- [iPod photo](#) (page 100)
- [iPod shuffle \(4th generation\)](#) (page 101)
- [iPod shuffle \(3rd generation\)](#) (page 102)
- [iPod shuffle \(2nd generation\)](#) (page 103)
- [iPod shuffle](#) (page 104)
- [iPod mini](#) (page 106)

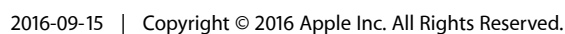
### Figure 7-1 iPhone 7 Plus Dimensional Drawing



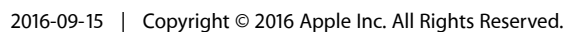
### Figure 7-2 iPhone 7 Dimensional Drawing



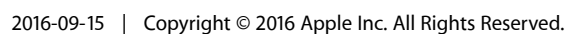
### Figure 7-3 iPhone 6s Plus Dimensional Drawing



### Figure 7-4 iPhone 6s Dimensional Drawing



### Figure 7-5 iPhone 6 Plus Dimensional Drawing

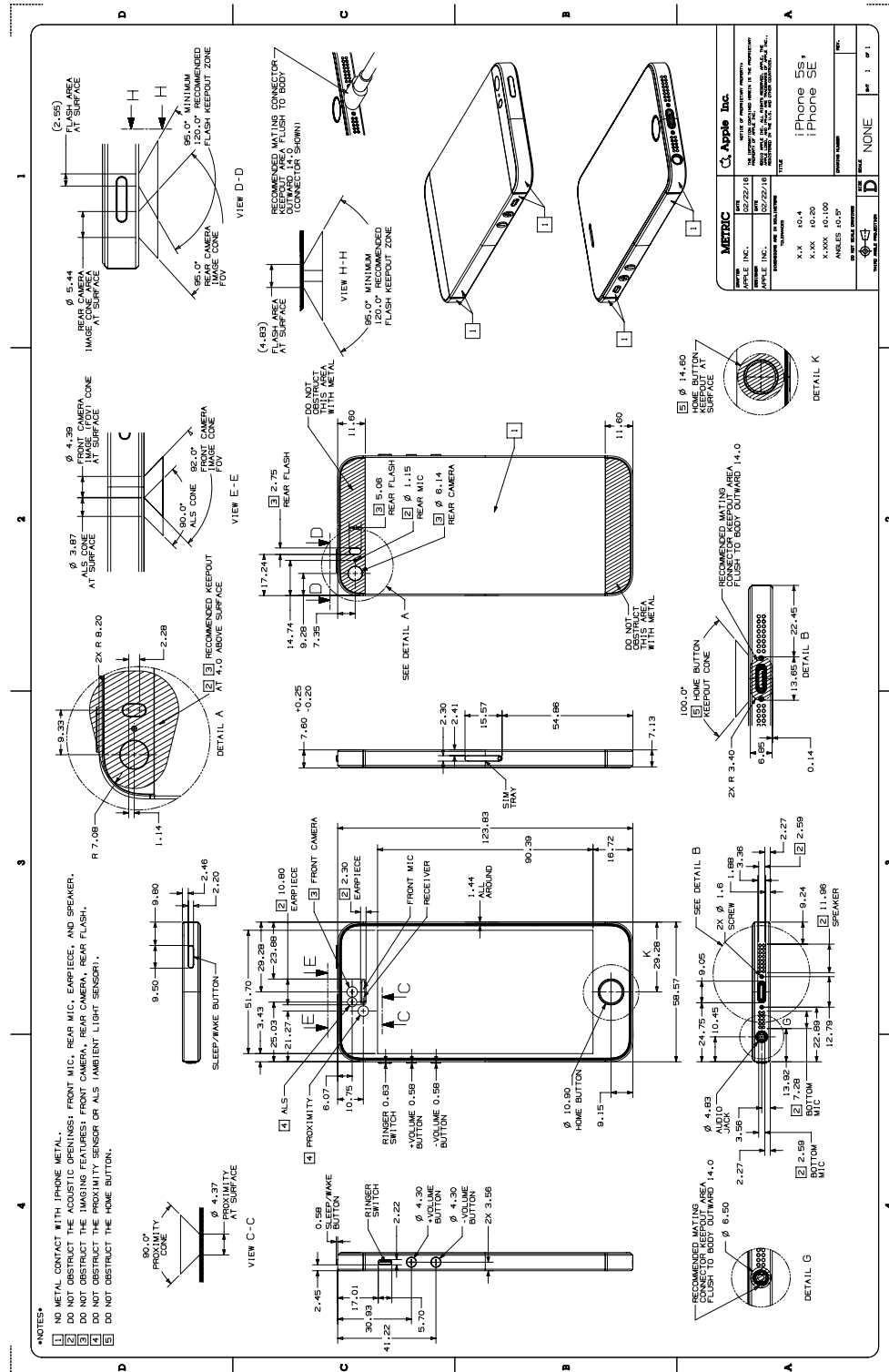


[illegible]

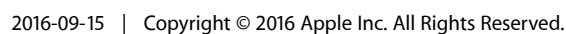


## 7.7 iPhone 5s &amp; iPhone SE

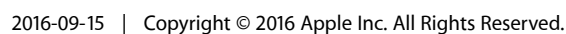
Figure 7-7 iPhone 5s &amp; iPhone SE Dimensional Drawing



### Figure 7-8 iPhone 5c Dimensional Drawing

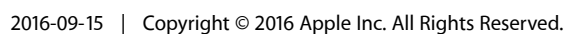


### Figure 7-9 iPhone 5 Dimensional Drawing



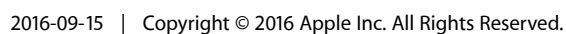
**Figure 7-10** iPhone 4s Dimensional Drawing

**Figure 7-10** iPhone 4s Dimensional Drawing

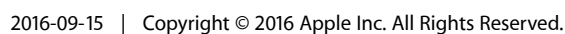


### Figure 7-11 iPhone 4CDMA Dimensional Drawing

### Figure 7-11 iPhone 4CDMA Dimensional Drawing

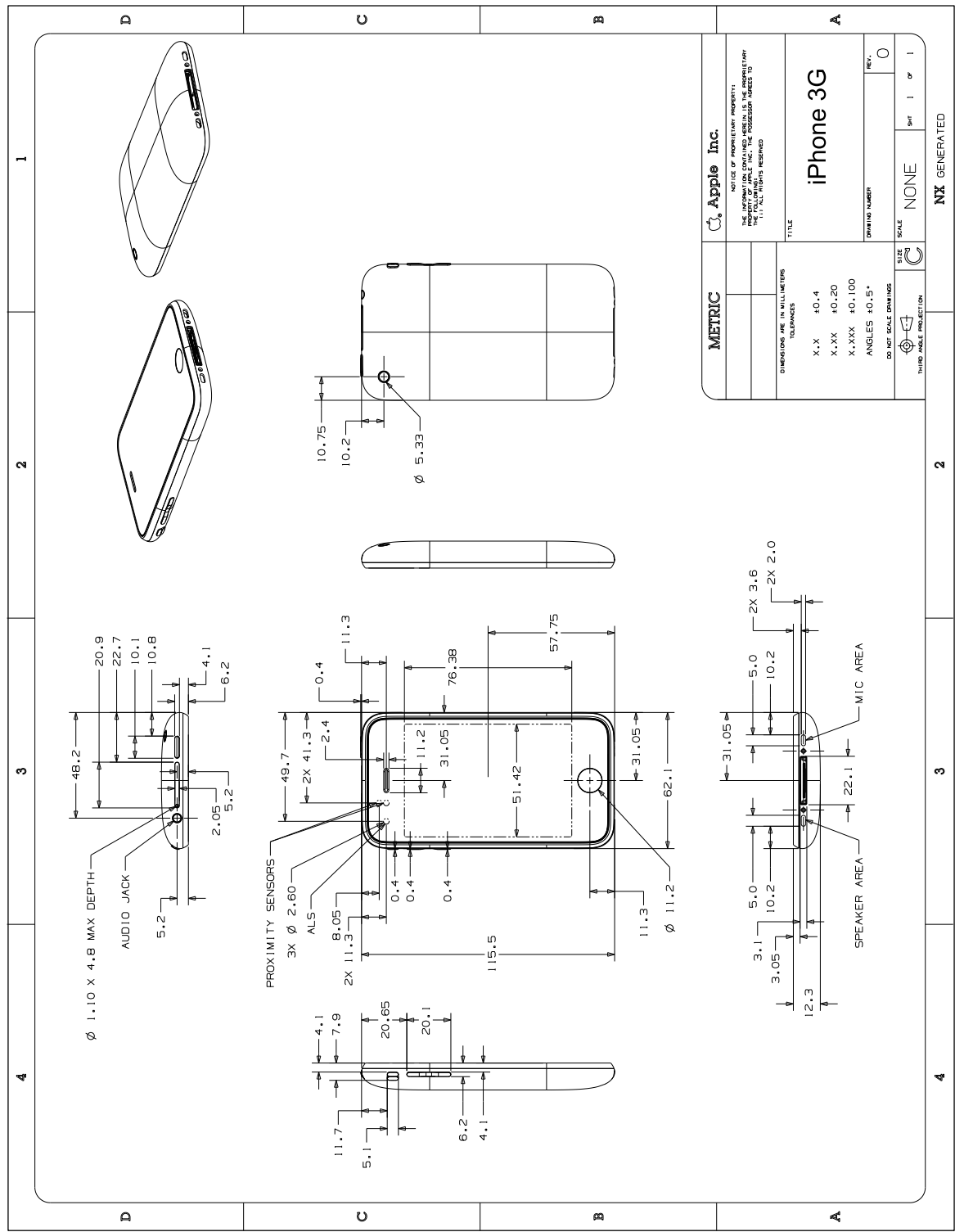


**Figure 7-12** iPhone 4 GSM Dimensional Drawing



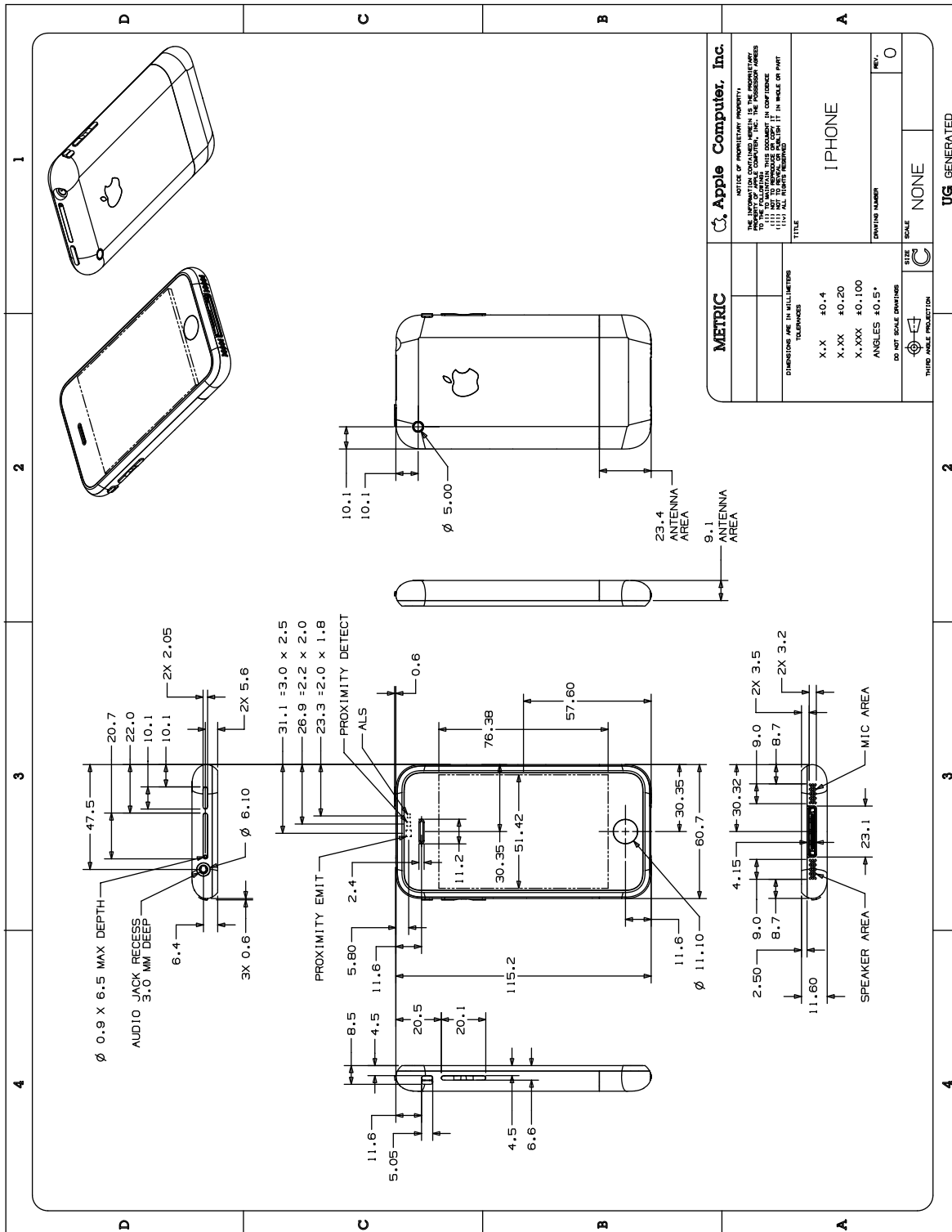
# 7.13 iPhone 3G and iPhone 3GS

Figure 7-13 iPhone 3G and iPhone 3GS Dimensional Drawing



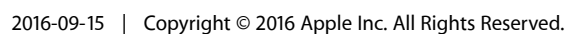
## 7.14 iPhone

Figure 7-14 iPhone Dimensional Drawing





**Figure 7-15** iPad Pro (9.7-inch) with Wi-Fi Dimensional Drawing



**NOTES**

- 1 DO NOT OBSTRUCT ACUSTIC OPENINGS: SIDE MIC, REAR MIC, AUDIO JACK, SPEAKERS
- 2 DO NOT OBSTRUCT IMAGING FEATURES: FRONT CAMERA, REAR CAMERA, REAR FLASH
- 3 DO NOT OBSTRUCT AMBIENT LIGHT SENSOR (ALS)
- 4 DO NOT OBSTRUCT GLASS WITH METAL
- 5 DO NOT OBSTRUCT ENCLOSURE WITH METAL
- 6 DO NOT OBSTRUCT GLASS WITH METAL
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**BX**

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**BZ**

**CA**

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**CI**

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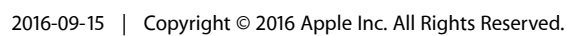
**GV**

**GW**

**GX**

**GY**

**Figure 7-17** iPad Pro (9.7-inch) Magnet and Hall Effect Sensor Locations 1 of 2 Dimensional Drawing



Technical drawing of the Apple iMac G4 (2009) showing various views and details. The drawing includes a top view (A), a front view (B), a side view (C), and a rear view (D). It also includes detailed views of the base (E, F, G, H, I, J, K, L) and the display (M). The drawing is labeled with dimensions and part numbers. The Apple logo is visible in the top right corner.

**NOTES**

- DO NOT OBSTRUCT ACOUSTIC OPENINGS: SIDE MIC, REAR MIC, AUDIO JACK, SPEAKERS
- DO NOT OBSTRUCT IMAGING FEATURES: FRONT CAMERA, REAR CAMERA
- DO NOT OBSTRUCT AMBIENT LIGHT SENSOR (ALS)
- DO NOT OBSTRUCT THE HOME BUTTON
- DO NOT OBSTRUCT GLASS WITH METAL

**DETAIL A**  
SCALE 2:1

**DETAIL B**  
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**DETAIL C**  
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**DETAIL D**  
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**DETAIL GV**  
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**DETAIL GW**  
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**DETAIL GX**  
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**DETAIL GY**  
SCALE 2:1

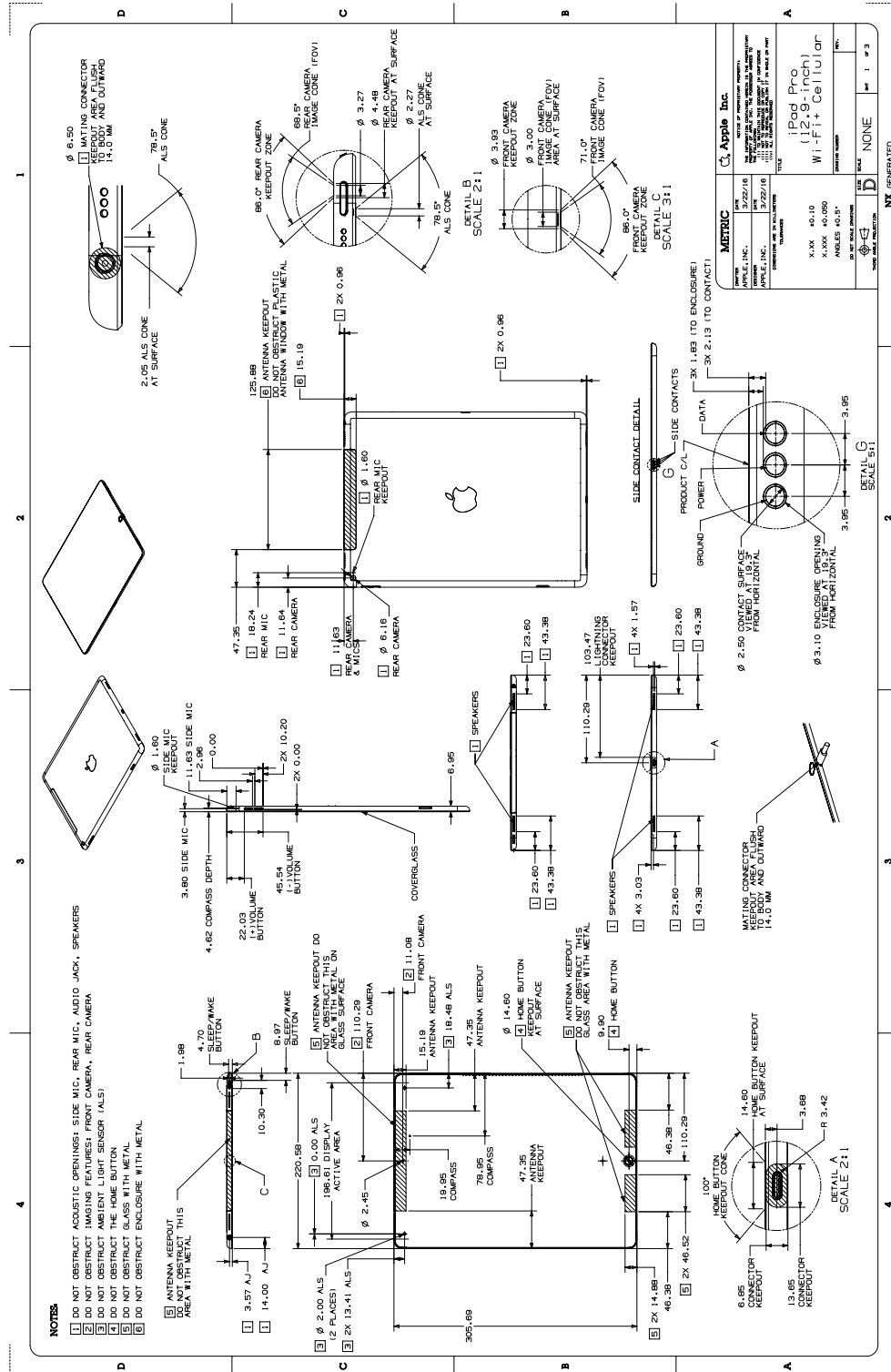
**DETAIL GZ**  
SCALE 2:1

**DETAIL HA**  
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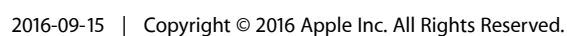
**DETAIL HB</**

## 7.19 iPad Pro (12.9-inch) with Wi-Fi + Cellular

Figure 7-20 iPad Pro (12.9-inch) with Wi-Fi + Cellular Dimensional Drawing



**Figure 7-21** iPad Pro (12.9-inch) Magnet and Hall Effect Sensor Locations 1 of 2 Dimensional Drawing



Technical drawing of a connector assembly, showing a side contact detail and a detailed view of the contact area.

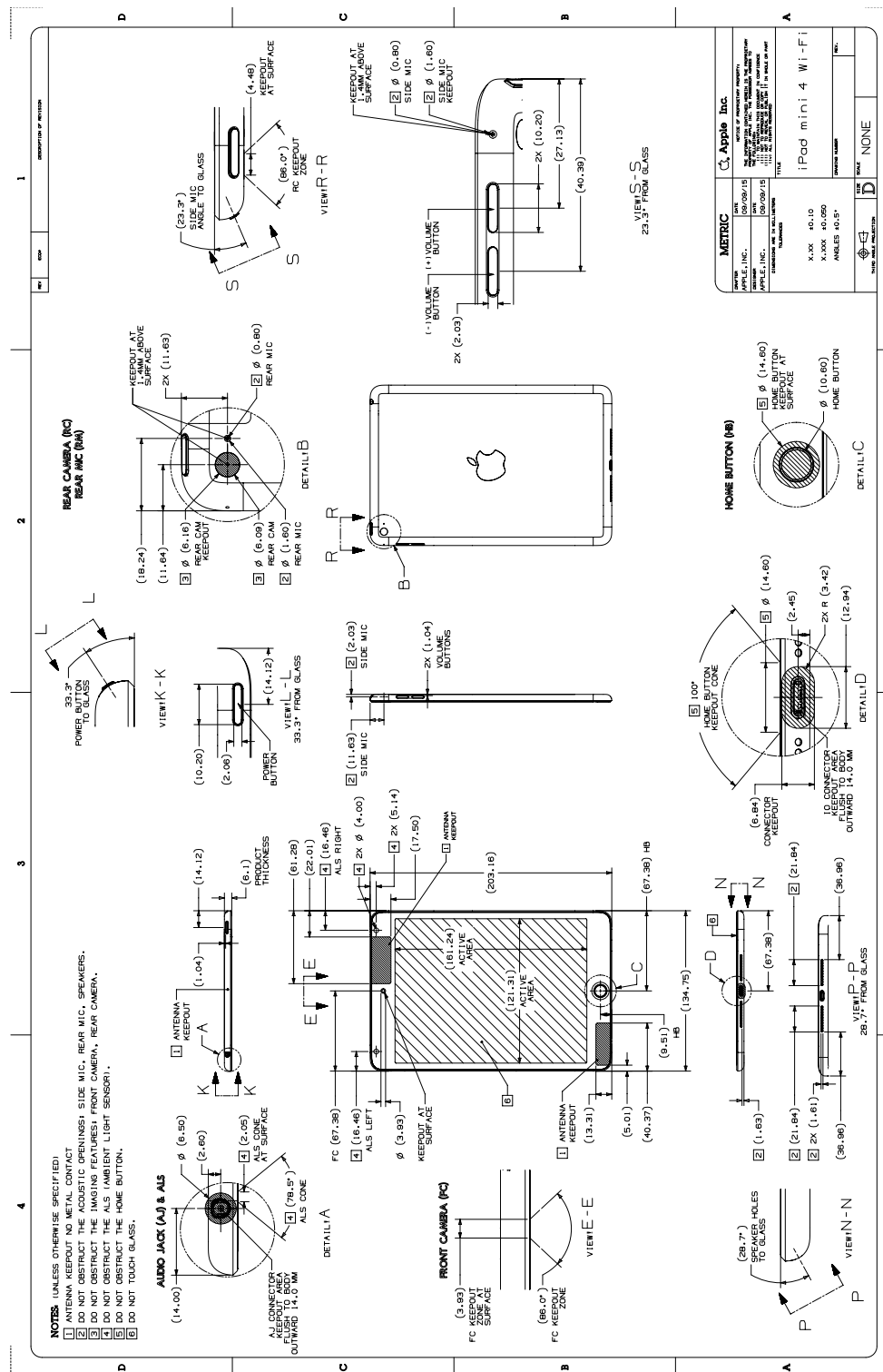
**Side Contact Detail:** A side view of the connector showing the contact area. The contact area is labeled "SIDE CONTACTS" and "CONTACT C/L". The contact area is defined by a circle with a diameter of 3.10 inches. The contact area is divided into three sections: "PRODUCT C/L", "POWER", and "DATA". The contact area is also divided into three sections: "3x 1.83 (TO ENCLOSURE)", "3x 2.13 (TO CONTACT)", and "3x 1.83 (TO ENCLOSURE)".

**Detail F:** A detailed view of the contact area, showing the contact area divided into three sections: "PRODUCT C/L", "POWER", and "DATA". The contact area is defined by a circle with a diameter of 3.10 inches. The contact area is divided into three sections: "3x 1.83 (TO ENCLOSURE)", "3x 2.13 (TO CONTACT)", and "3x 1.83 (TO ENCLOSURE)".

**Dimensions:** The drawing includes various dimensions in inches, including 1.83, 2.13, 3.10, 3.95, 4.13, 4.73, 5.93, 6.93, 7.13, 7.33, 7.53, 7.73, 7.93, 8.13, 8.33, 8.53, 8.73, 8.93, 9.13, 9.33, 9.53, 9.73, 9.93, 10.13, 10.33, 10.53, 10.73, 10.93, 11.13, 11.33, 11.53, 11.73, 11.93, 12.13, 12.33, 12.53, 12.73, 12.93, 13.13, 13.33, 13.53, 13.73, 13.93, 14.13, 14.33, 14.53, 14.73, 14.93, 15.13, 15.33, 15.53, 15.73, 15.93, 16.13, 16.33, 16.53, 16.73, 16.93, 17.13, 17.33, 17.53, 17.73, 17.93, 18.13, 18.33, 18.53, 18.73, 18.93, 19.13, 19.33, 19.53, 19.73, 19.93, 20.13, 20.33, 20.53, 20.73, 20.93, 21.13, 21.33, 21.53, 21.73, 21.93, 22.13, 22.33, 22.53, 22.73, 22.93, 23.13, 23.33, 23.53, 23.73, 23.93, 24.13, 24.33, 24.53, 24.73, 24.93, 25.13, 25.33, 25.53, 25.73, 25.93, 26.13, 26.33, 26.53, 26.73, 26.93, 27.13, 27.33, 27.53, 27.73, 27.93, 28.13, 28.33, 28.53, 28.73, 28.93, 29.13, 29.33, 29.53, 29.73, 29.93, 30.13, 30.33, 30.53, 30.73, 30.93, 31.13, 31.33, 31.53, 31.73, 31.93, 32.13, 32.33, 32.53, 32.73, 32.93, 33.13, 33.33, 33.53, 33.73, 33.93, 34.13, 34.33, 34.53, 34.73, 34.93, 35.13, 35.33, 35.53, 35.73, 35.93, 36.13, 36.33, 36.53, 36.73, 36.93, 37.13, 37.33, 37.53, 37.73, 37.93, 38.13, 38.33, 38.53, 38.73, 38.93, 39.13, 39.33, 39.53, 39.73, 39.93, 40.13, 40.33, 40.53, 40.73, 40.93, 41.13, 41.33, 41.53, 41.73, 41.93, 42.13, 42.33, 42.53, 42.73, 42.93, 43.13, 43.33, 43.53, 43.73, 43.93, 44.13, 44.33, 44.53, 44.73, 44.93, 45.13, 45.33, 45.53, 45.73, 45.93, 46.13, 46.33, 46.53, 46.73, 46.93, 47.13, 47.33, 47.53, 47.73, 47.93, 48.13, 48.33, 48.53, 48.73, 48.93, 49.13, 49.33, 49.53, 49.73, 49.93, 50.13, 50.33, 50.53, 50.73, 50.93, 51.13, 51.33, 51.53, 51.73, 51.93, 52.13, 52.33, 52.53, 52.73, 52.93, 53.13, 53.33, 53.53, 53.73, 53.93, 54.13, 54.33, 54.53, 54.73, 54.93, 55.13, 55.33, 55.53, 55.73, 55.93, 56.13, 56.33, 56.53, 56.73, 56.93, 57.13, 57.33, 57.53, 57.73, 57.93, 58.13, 58.33, 58.53, 58.73, 58.93, 59.13, 59.33, 59.53, 59.73, 59.93, 60.13, 60.33, 60.53, 60.73, 60.93, 61.13, 61.33, 61.53, 61.73, 61.93, 62.13, 62.33, 62.53, 62.73, 62.93, 63.13, 63.33, 63.53, 63.73, 63.93, 64.13, 64.33, 64.53, 64.73, 64.93, 65.13, 65.33, 65.53, 65.73, 65.93, 66.13, 66.33, 66.53, 66.73, 66.93, 67.13, 67.33, 67.53, 67.73, 67.93, 68.13, 68.33, 68.53, 68.73, 68.93, 69.13, 69.33, 69.53, 69.73, 69.93, 70.13, 70.33, 70.53, 70.73, 70.93, 71.13, 71.33, 71.53, 71.73, 71.93, 72.13, 72.33, 72.53, 72.73, 72.93, 73.13, 73.33, 73.53, 73.73, 73.93, 74.13, 74.33, 74.53, 74.73, 74.93, 75.13, 75.33, 75.53, 75.73, 75.93, 76.13, 76.33, 76.53, 76.73, 76.93, 77.13, 77.33, 77.53, 77.73, 77.93, 78.13, 78.33, 78.53, 78.73, 78.93, 79.13, 79.33, 79.53, 79.73, 79.93, 80.13, 80.33, 80.53, 80.73, 80.93, 81.13, 81.33, 81.53, 81.73, 81.93, 82.13, 82.33, 82.53, 82.73, 82.93, 83.13, 83.33, 83.53, 83.73, 83.93, 84.13, 84.33, 84.53, 84.73, 84.93, 85.13, 85.33, 85.53, 85.73, 85.93, 86.13, 86.33, 86.53, 86.73, 86.93, 87.13, 87.33, 87.53, 87.73, 87.93, 88.13, 88.33, 88.53, 88.73, 88.93, 89.13, 89.33, 89.53, 89.73, 89.93, 90.13, 90.33, 90.53, 90.73, 90.93, 91.13, 91.33, 91.53, 91.73, 91.93, 92.13, 92.33, 92.53, 92.73, 92.93, 93.13, 93.33, 93.53, 93.73, 93.93, 94.13, 94.33, 94.53, 94.73, 94.93, 95.13, 95.33, 95.53, 95.73, 95.93, 96.13, 96.33, 96.53, 96.73, 96.93, 97.13, 97.33, 97.53, 97.73, 97.93, 98.13, 98.33, 98.53, 98.73, 98.93, 99.13, 99.33, 99.53, 99.73, 99.93, 100.13, 100.33, 100.53, 100.73, 100.93, 101.13, 101.33, 101.53, 101.73, 101.93, 102.13, 102.33, 102.53, 102.73, 102.93, 103.13, 103.33, 103.53, 103.73, 103.93, 104.13, 104.33, 104.53, 104.73, 104.93, 105.13, 105.33, 105.53, 105.73, 105.93, 106.13, 106.33, 106.53, 106.73, 106.93, 107.13, 107.33, 107.53, 107.73, 107.93, 108.13, 108.33, 108.53, 108.73, 108.93, 109.13, 109.33, 109.53, 109.73, 109.93, 110.13, 110.33, 110.53, 110.73, 110.93, 111.13, 111.33, 111.53, 111.73, 111.93, 112.13, 112.33, 1



**Figure 7-23** iPad mini 4 with Wi-Fi Dimensional Drawing



**NOTES (UNLESS OTHERWISE SPECIFIED)**

- 1 ANTENNA KEYPART NO METAL CONTACT
- 2 DO NOT OBSTRUCT THE ACOUSTIC OPENINGS: SIDE MIC, REAR MIC, SPEAKERS.
- 3 DO NOT OBSTRUCT THE IMAGING FEATURES: FRONT CAMERA, REAR CAMERA.
- 4 DO NOT OBSTRUCT THE ALS (AMBIENT LIGHT SENSOR).
- 5 DO NOT TOUCH GLASS.
- 6 DO NOT OBSTRUCT THE HOME BUTTON.

**REAR CAMERA (RC) REAR MIC (RM)**

**VIEW K-K**

**VIEW L-L**

**VIEW M-M**

**VIEW N-N**

**VIEW O-O**

**VIEW P-P**

**VIEW Q-Q**

**VIEW R-R**

**VIEW S-S**

**VIEW T-T**

**VIEW U-U**

**VIEW V-V**

**VIEW W-W**

**VIEW X-X**

**VIEW Y-Y**

**VIEW Z-Z**

**VIEW AA-AA**

**VIEW BB-BB**

**VIEW CC-CC**

**VIEW DD-DD**

**VIEW EE-EE**

**VIEW FF-FF**

**VIEW GG-GG**

**VIEW HH-HH**

**VIEW II-II**

**VIEW JJ-JJ**

**VIEW KK-KK**

**VIEW LL-LL**

**VIEW MM-MM**

**VIEW NN-NN**

**VIEW OO-OO**

**VIEW PP-PP**

**VIEW QQ-QQ**

**VIEW RR-RR**

**VIEW SS-SS**

**VIEW TT-TT**

**VIEW UU-UU**

**VIEW VV-VV**

**VIEW WW-WW**

**VIEW XX-XX**

**VIEW YY-YY**

**VIEW ZZ-ZZ**

**VIEW AA-AA**

**VIEW BB-BB**

**VIEW CC-CC**

**VIEW DD-DD**

**VIEW EE-EE**

**VIEW FF-FF**

**VIEW GG-GG**

**VIEW HH-HH**

**VIEW II-II**

**VIEW JJ-JJ**

**VIEW KK-KK**

**VIEW LL-LL**

**VIEW MM-MM**

**VIEW NN-NN**

**VIEW OO-OO**

**VIEW PP-PP**

**VIEW QQ-QQ**

**VIEW RR-RR**

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**VIEW UU-UU**

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**VIEW ZZ-ZZ**

**VIEW AA-AA**

**VIEW BB-BB**

**VIEW CC-CC**

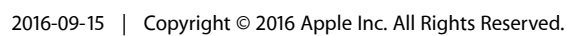
**VIEW DD-DD**

**VIEW EE-EE**

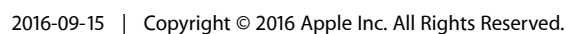
**VIEW FF-FF**

**VIEW GG-GG</**

**Figure 7-25** iPad mini 4 Magnet and Hall Effect Sensor Locations Dimensional Drawing



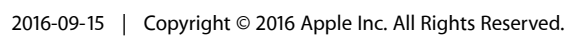
**Figure 7-26** iPad Air 2 with Wi-Fi Dimensional Drawing



[illegible]

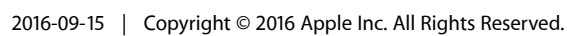
**Figure 7-28** iPad mini 2 & iPad mini 3 with Wi-Fi Dimensional Drawing

**Figure 7-28** iPad mini 2 & iPad mini 3 with Wi-Fi Dimensional Drawing

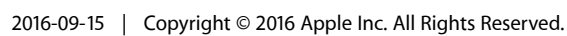


**Figure 7-29** iPad mini 2 & iPad mini 3 with Wi-Fi + Cellular Dimensional Drawing

**Figure 7-29** iPad mini 2 & iPad mini 3 with Wi-Fi + Cellular Dimensional Drawing



**Figure 7-30** iPad Air with Wi-Fi Dimensional Drawing





**NOTES (UNLESS OTHERWISE SPECIFIED)**

- 1. FRONT VIEW
- 2. REAR VIEW
- 3. SIDE VIEW (RIGHT)
- 4. SIDE VIEW (LEFT)

**Dimensions and Callouts:**

- Front View:**
  - Overall Width: 240.0
  - Overall Height: 186.1
  - Top Bezel: 1.4
  - Bottom Bezel: 1.4
  - Left Bezel: 1.4
  - Right Bezel: 1.4
  - Home Button: 59.7 (diameter)
  - Camera: 7.3 (diameter)
  - Mic Area: 10.7 (width) x 2.3 (height)
  - Speaker Area: 3.1 (width) x 2.3 (height)
  - Audio Jack: 4.2 (diameter)
  - Rear Camera: 4.3 (diameter)
- Back View:**
  - Overall Width: 240.0
  - Overall Height: 186.1
  - Top Bezel: 1.4
  - Bottom Bezel: 1.4
  - Left Bezel: 1.4
  - Right Bezel: 1.4
  - Home Button: 59.7 (diameter)
  - Camera: 7.3 (diameter)
  - Mic Area: 10.7 (width) x 2.3 (height)
  - Speaker Area: 3.1 (width) x 2.3 (height)
  - Audio Jack: 4.2 (diameter)
  - Rear Camera: 4.3 (diameter)
- Side View (Right):**
  - Overall Width: 14.0
  - Overall Height: 14.0
  - Top Bezel: 1.4
  - Bottom Bezel: 1.4
  - Left Bezel: 1.4
  - Right Bezel: 1.4
  - Home Button: 59.7 (diameter)
  - Camera: 7.3 (diameter)
  - Mic Area: 10.7 (width) x 2.3 (height)
  - Speaker Area: 3.1 (width) x 2.3 (height)
  - Audio Jack: 4.2 (diameter)
  - Rear Camera: 4.3 (diameter)
- Side View (Left):**
  - Overall Width: 14.0
  - Overall Height: 14.0
  - Top Bezel: 1.4
  - Bottom Bezel: 1.4
  - Left Bezel: 1.4
  - Right Bezel: 1.4
  - Home Button: 59.7 (diameter)
  - Camera: 7.3 (diameter)
  - Mic Area: 10.7 (width) x 2.3 (height)
  - Speaker Area: 3.1 (width) x 2.3 (height)
  - Audio Jack: 4.2 (diameter)
  - Rear Camera: 4.3 (diameter)

**Apple Inc. Information:**

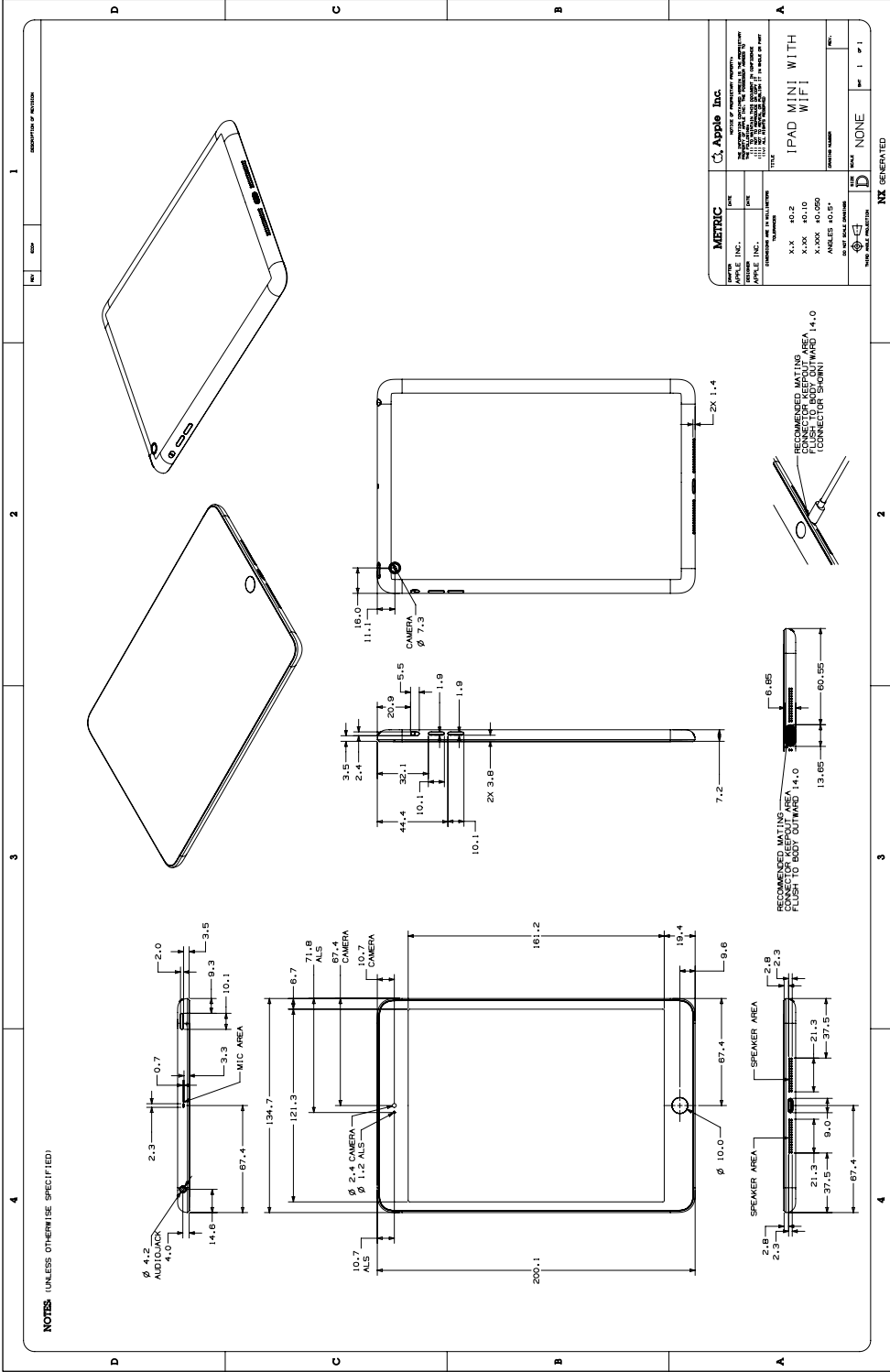
Apple Inc.  
100 Apple Park  
Cupertino, CA 95014  
www.apple.com

**Model:** A1460  
**Color:** Space Gray  
**Capacity:** 64GB  
**Release Date:** September 9, 2014

**Apple Air**  
Wi-Fi + Cellular

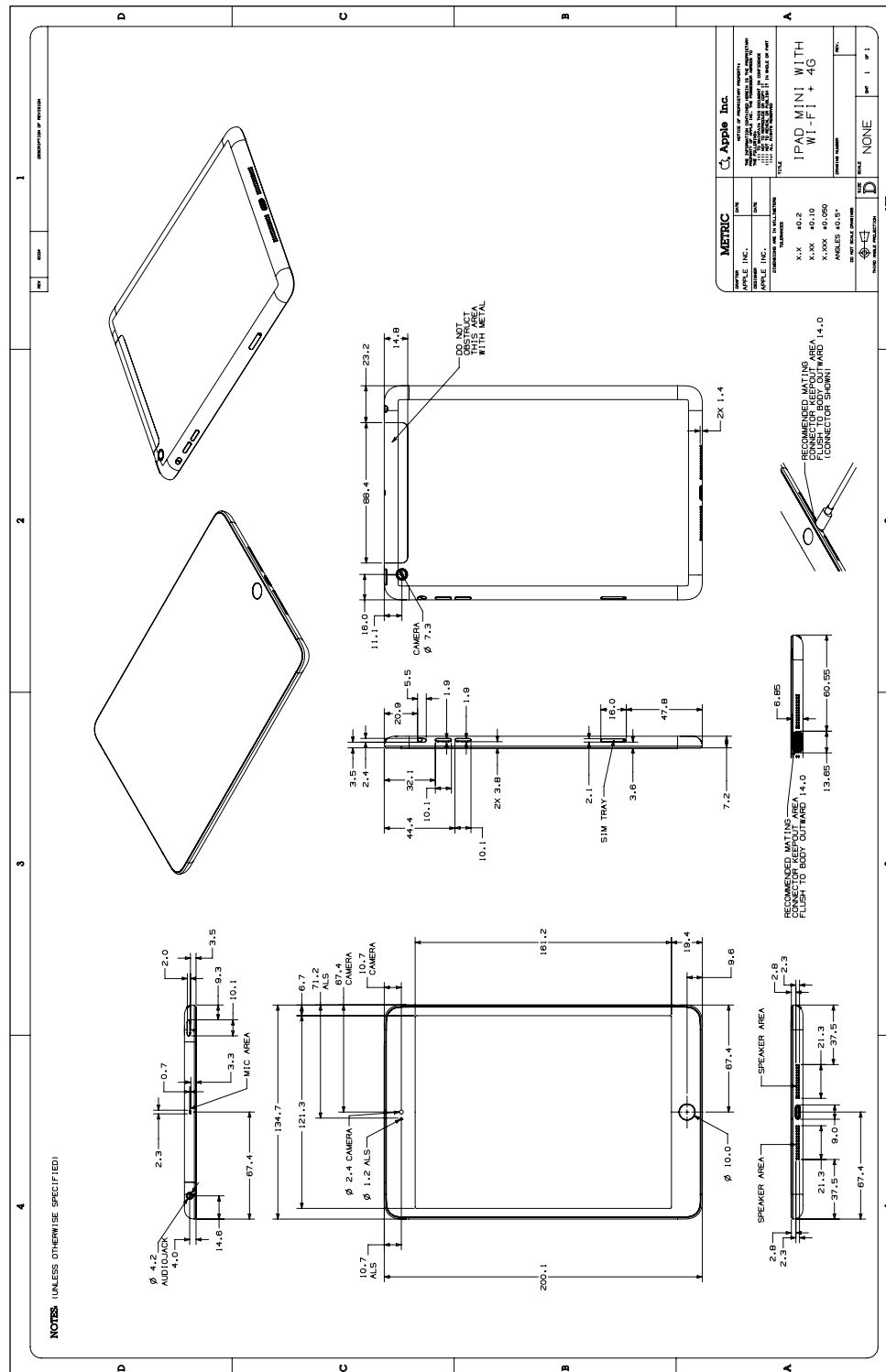
# 7.30 iPad mini with Wi-Fi

Figure 7-32 iPad mini with Wi-Fi Dimensional Drawing



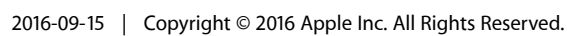
### 7.31 iPad mini with Wi-Fi + Cellular

**Figure 7-33** iPad mini with Wi-Fi + Cellular Dimensional Drawing



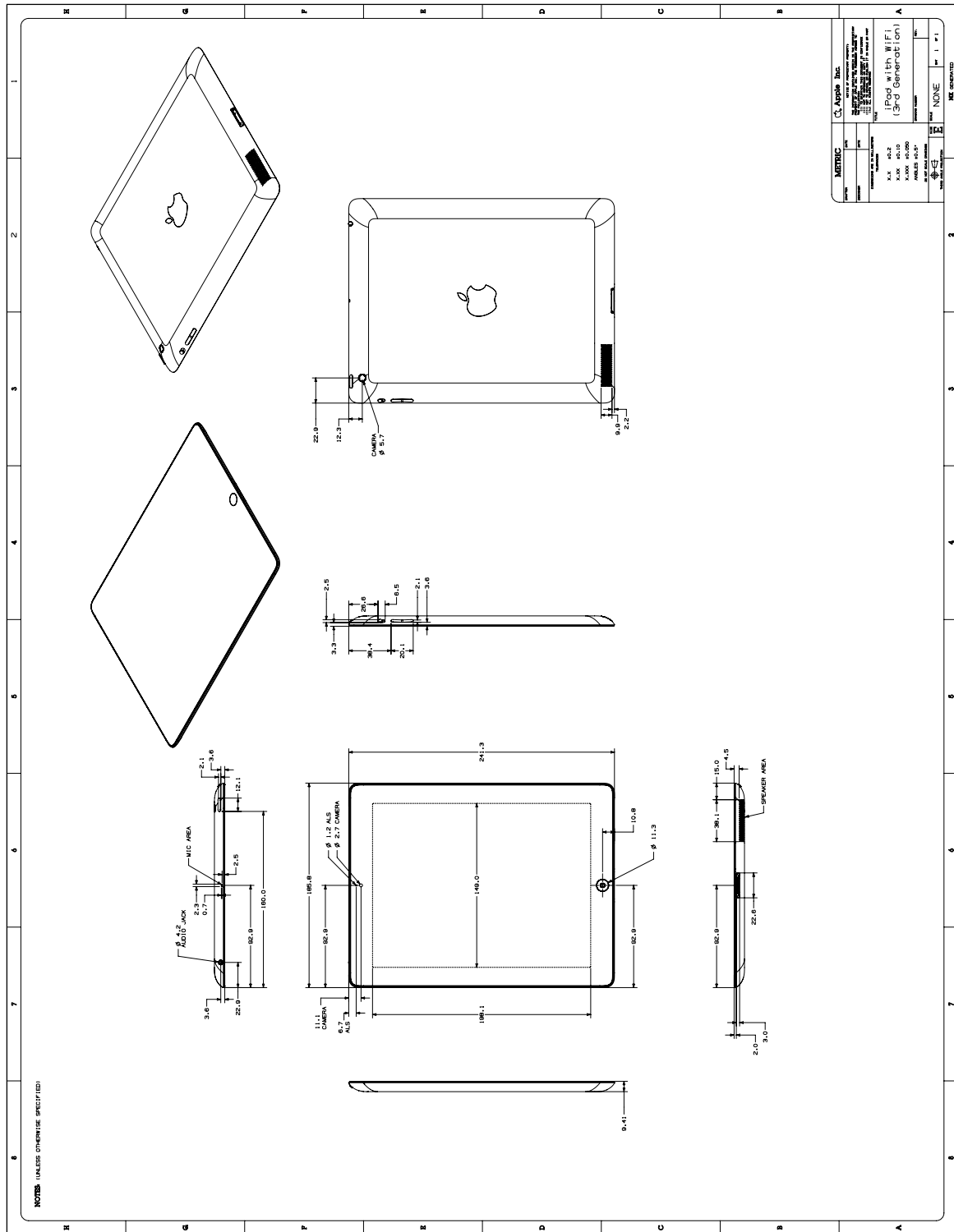
[illegible]

**Figure 7-35** iPad (4th generation) with Wi-Fi + Cellular Dimensional Drawing



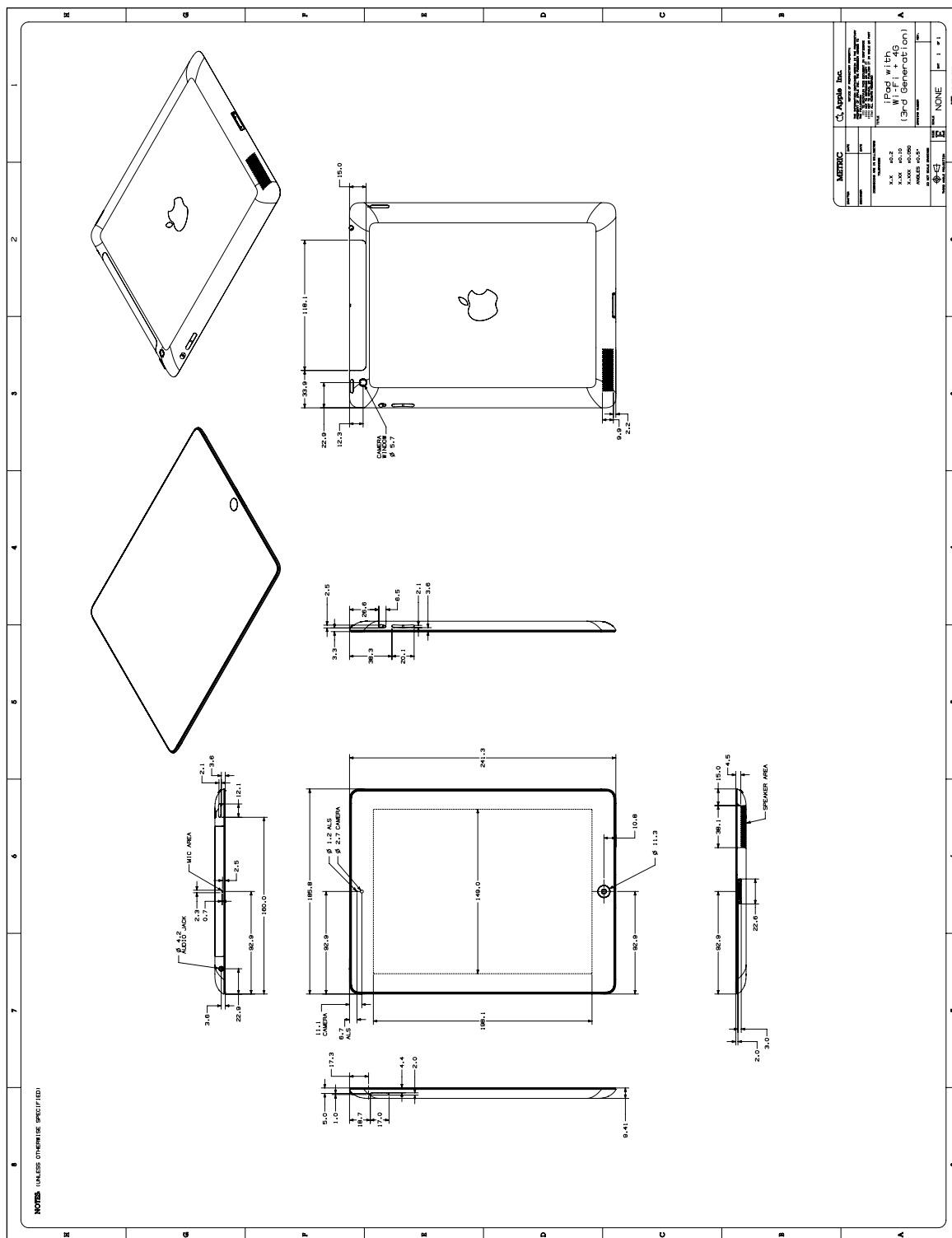
## 7.34 iPad (3rd generation) with Wi-Fi

Figure 7-36 iPad (3rd generation) with Wi-Fi Dimensional Drawing



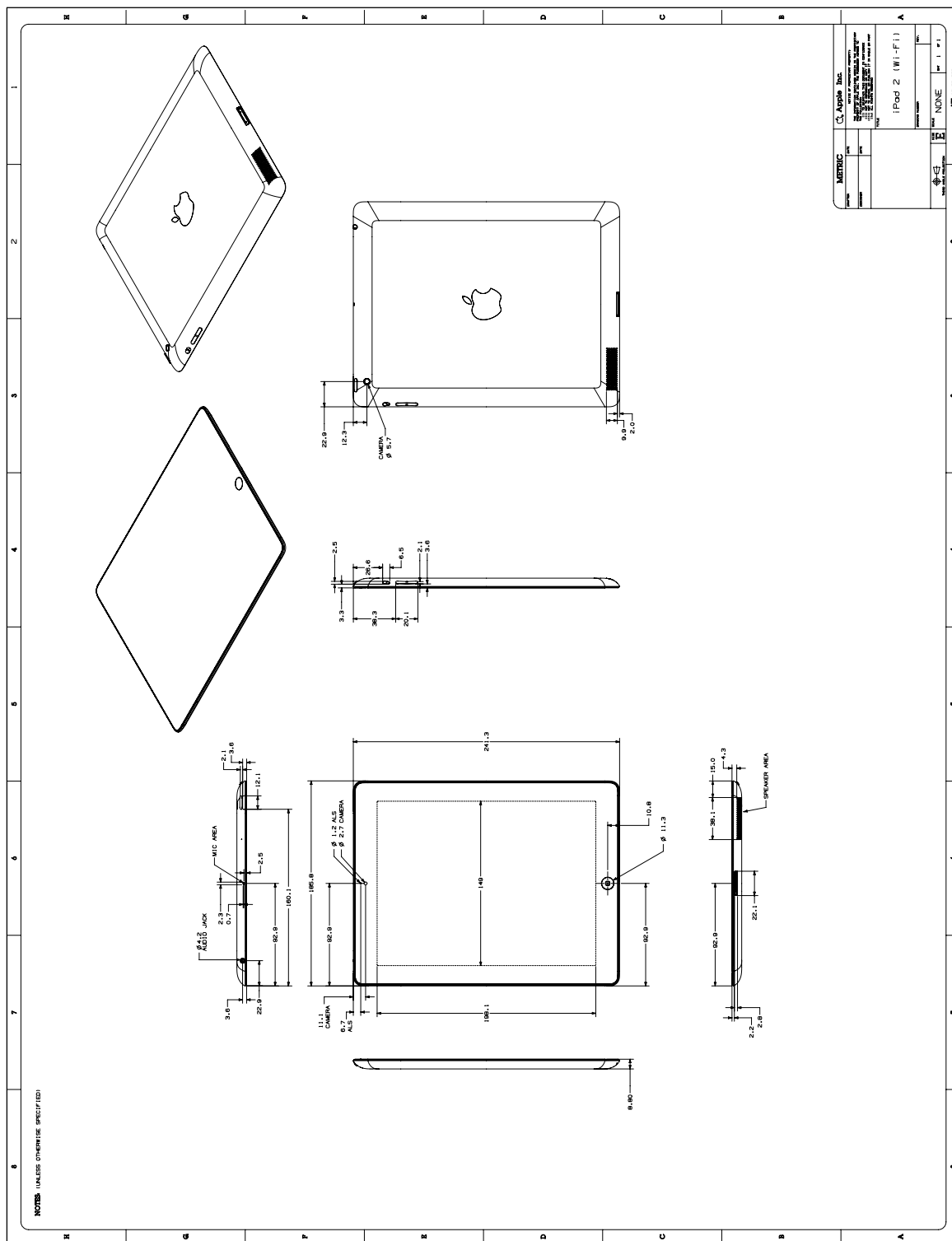
### 7.35 iPad (3rd generation) Wi-Fi + 4G

**Figure 7-37** iPad Wi-Fi + 4G (3rd Generation) Dimensional Drawing



## 7.36 iPad 2 with Wi-Fi

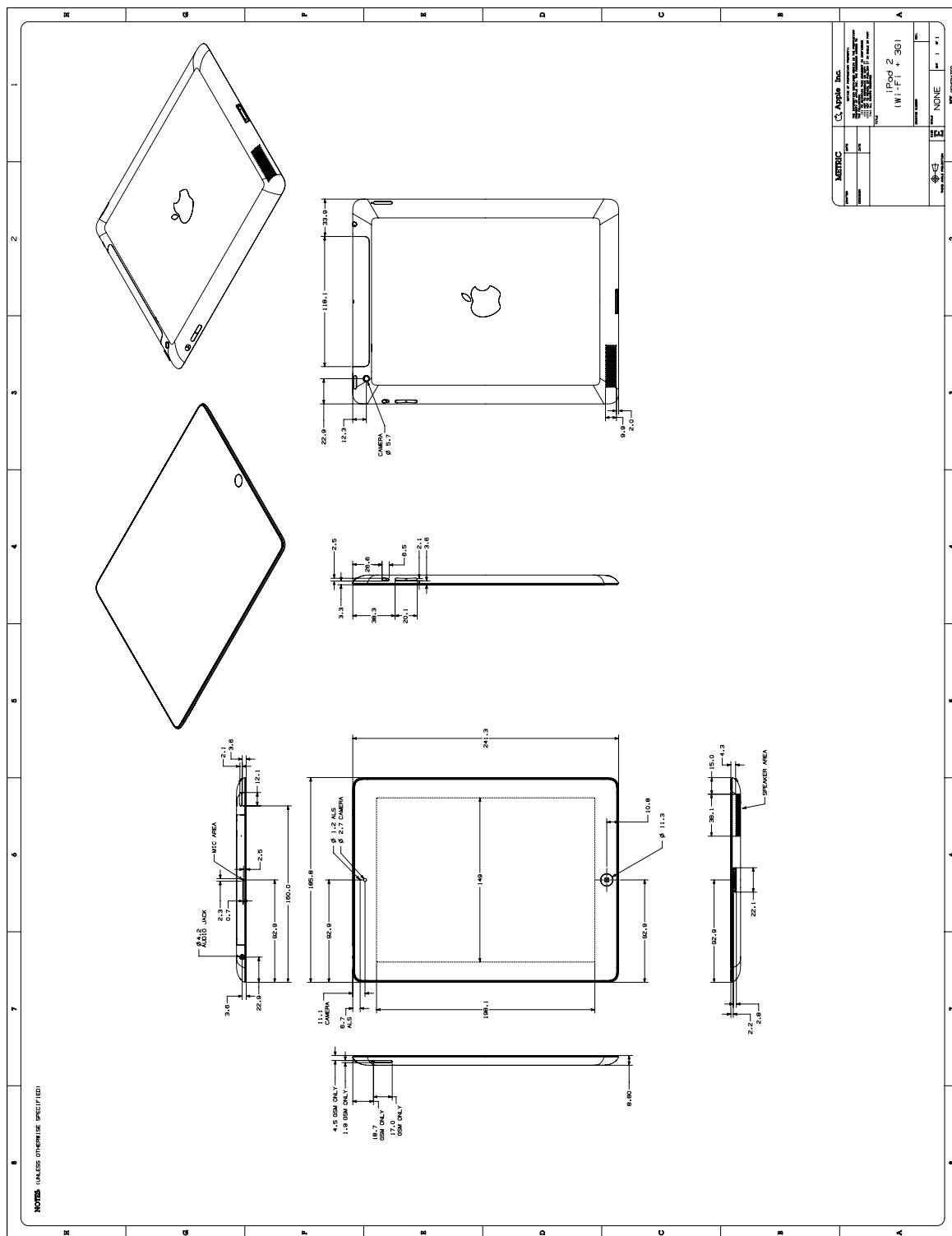
Figure 7-38 iPad 2 with Wi-Fi Dimensional Drawing





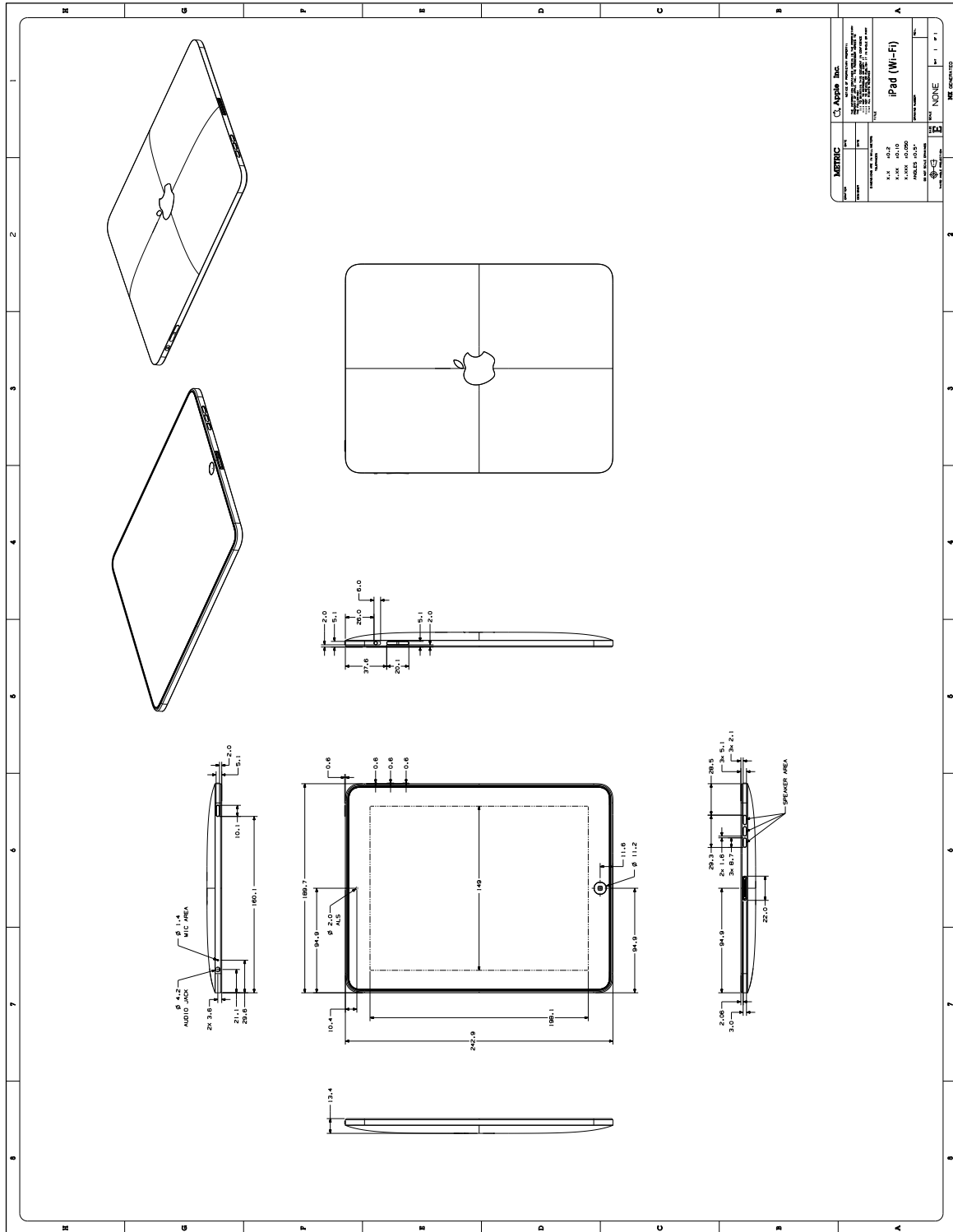
## 7.37 iPad 2 with Wi-Fi + 3G

Figure 7-39 iPad 2 Wi-Fi + 3G Dimensional Drawing



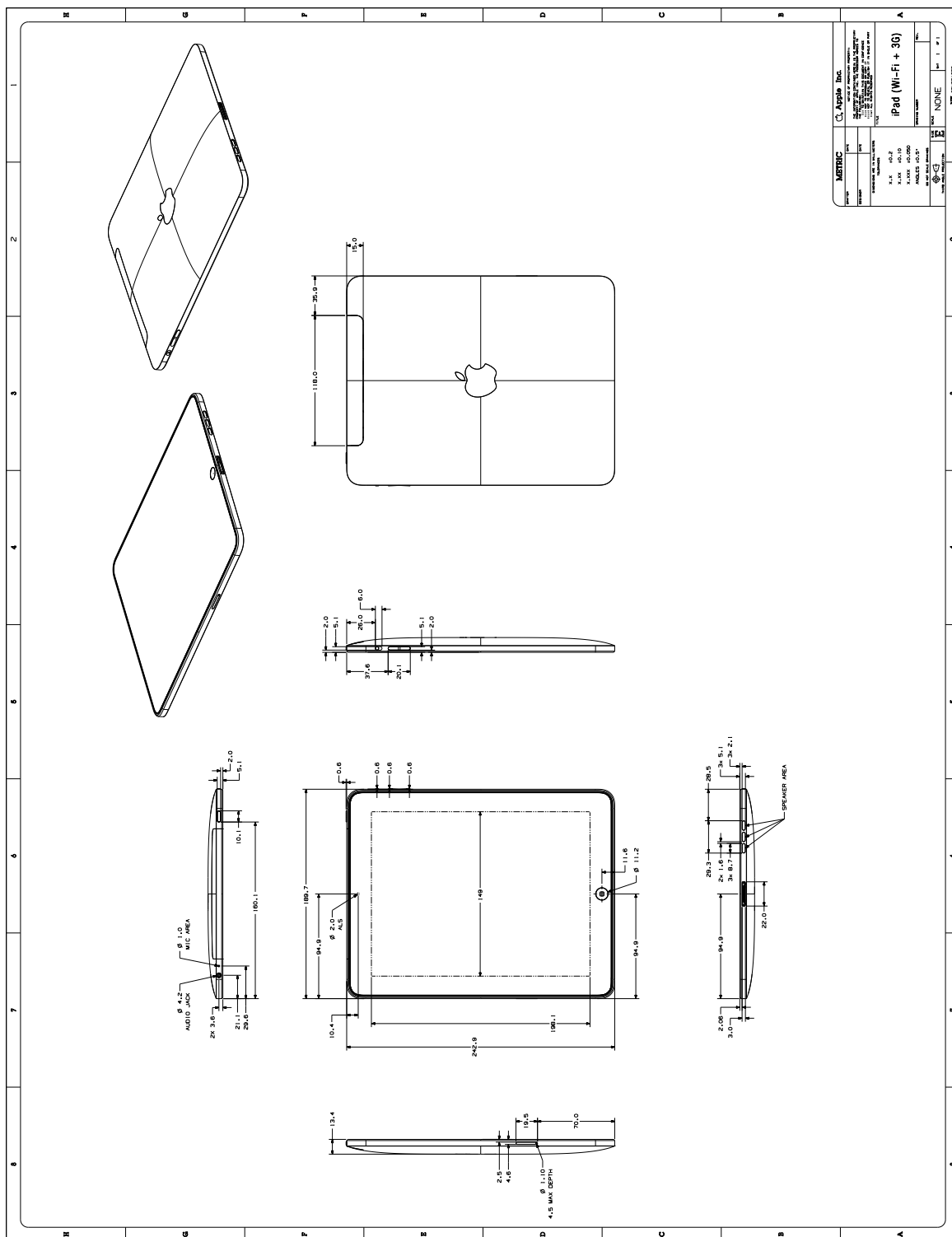
## 7.38 iPad with Wi-Fi

Figure 7-40 iPad Wi-Fi Dimensional Drawing



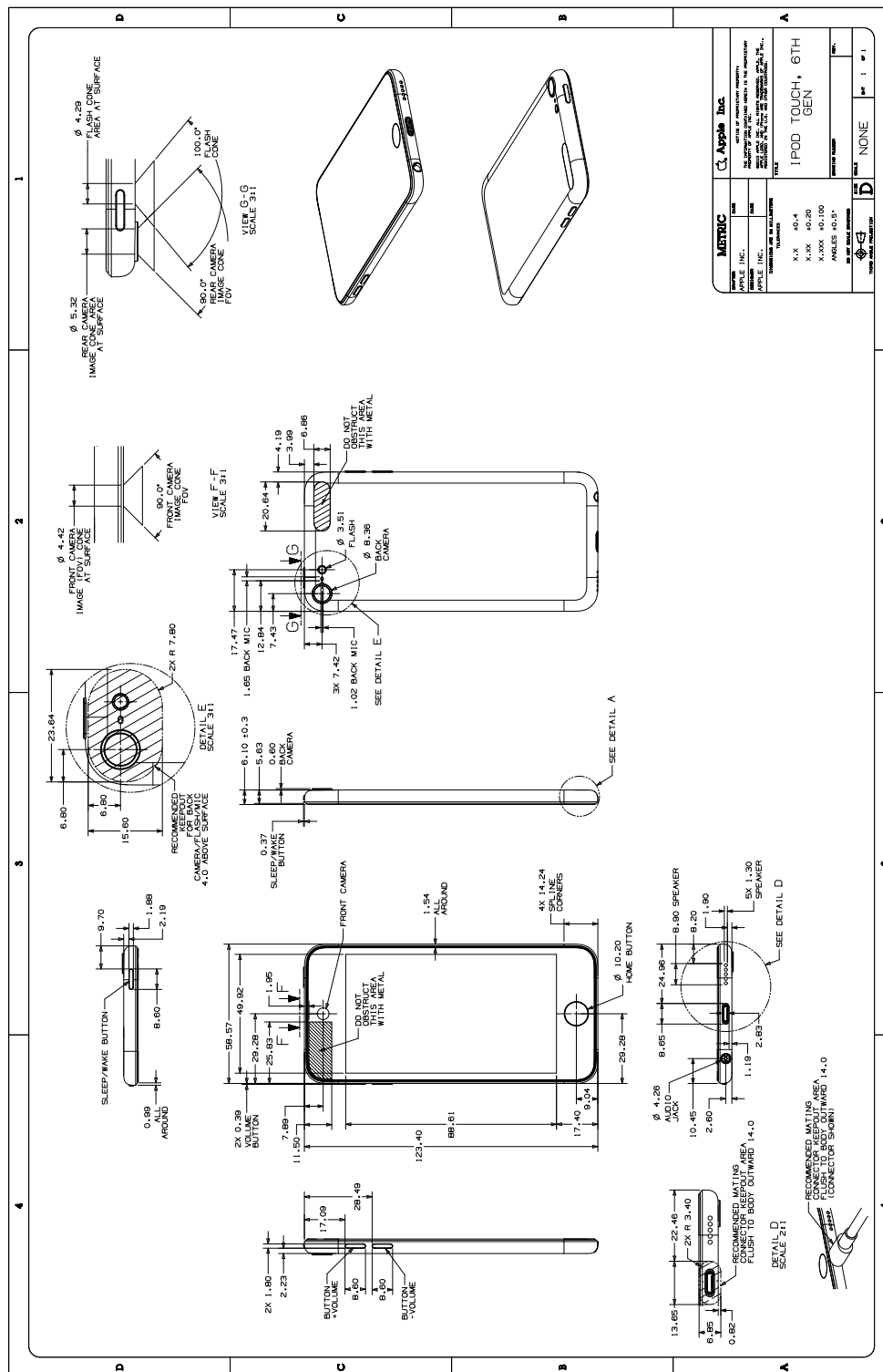
### 7.39 iPad with Wi-Fi + 3G

**Figure 7-41** iPad Wi-Fi + 3G Dimensional Drawing



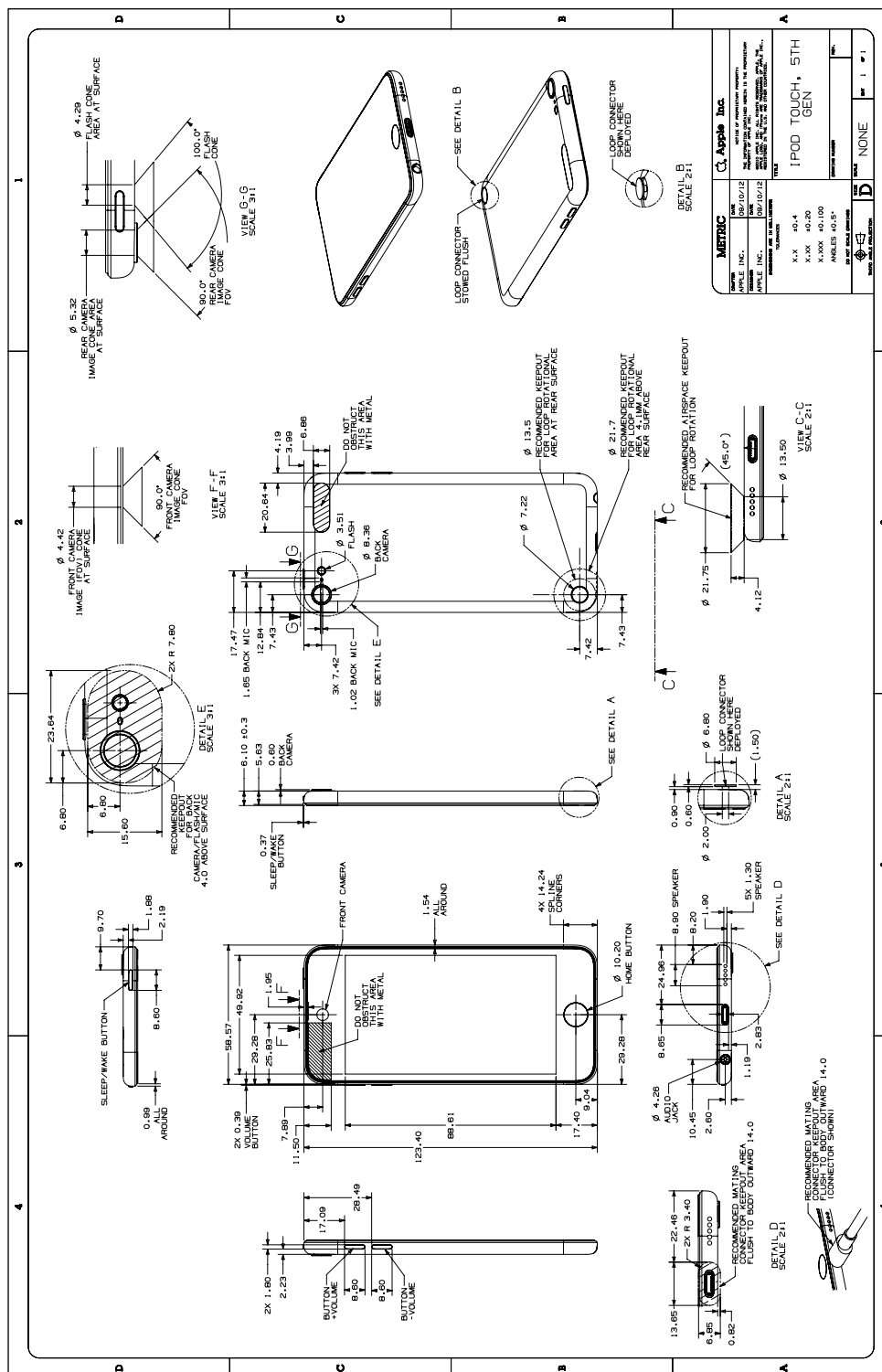
## 7.40 iPod touch (6th generation)

Figure 7-42 iPod touch (6th generation) Dimensional Drawing



## 7.41 iPod touch (5th generation)

Figure 7-43 iPod touch (5th generation) Dimensional Drawing

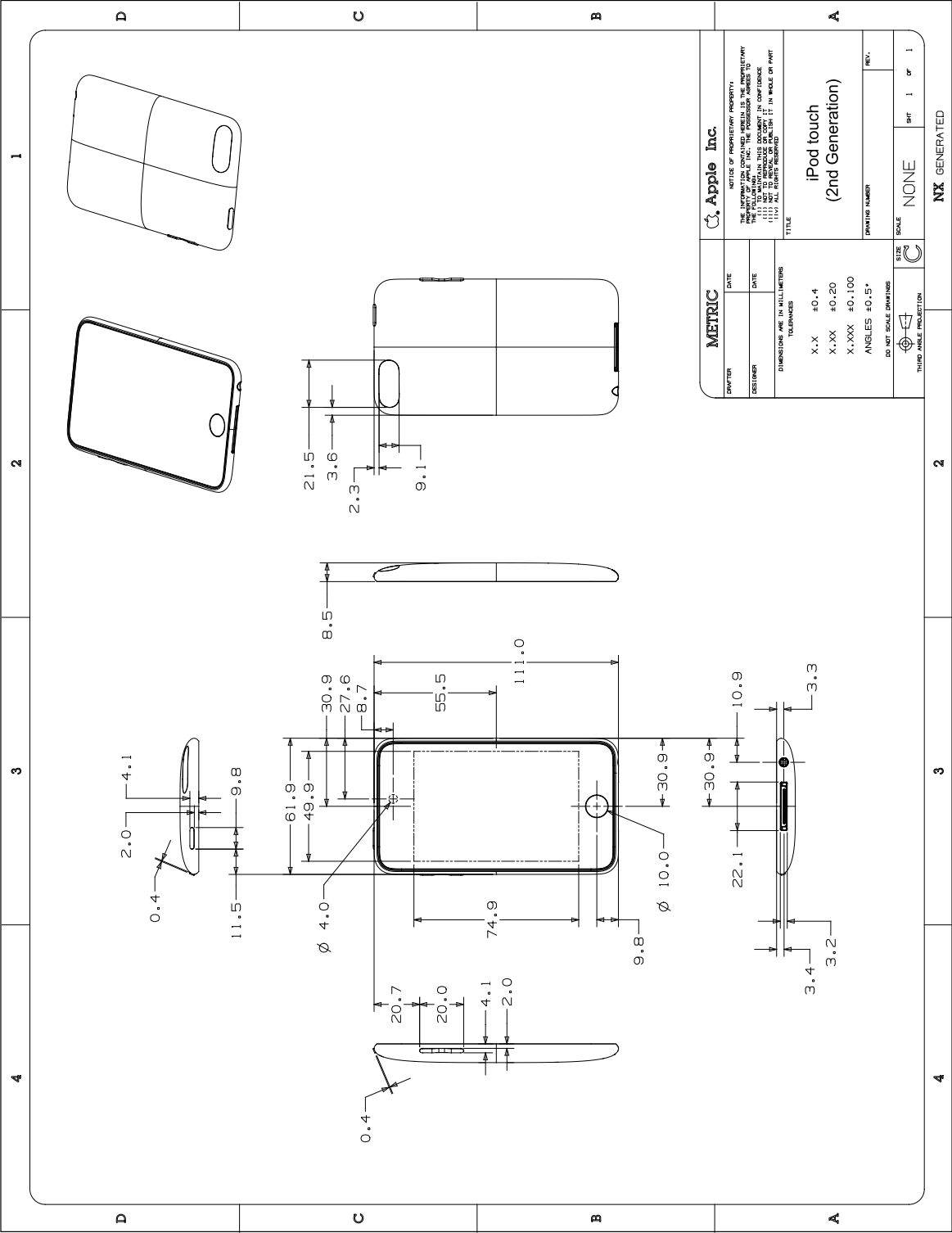


[illegible]

[illegible]

# 7.44 iPod touch (2nd generation)

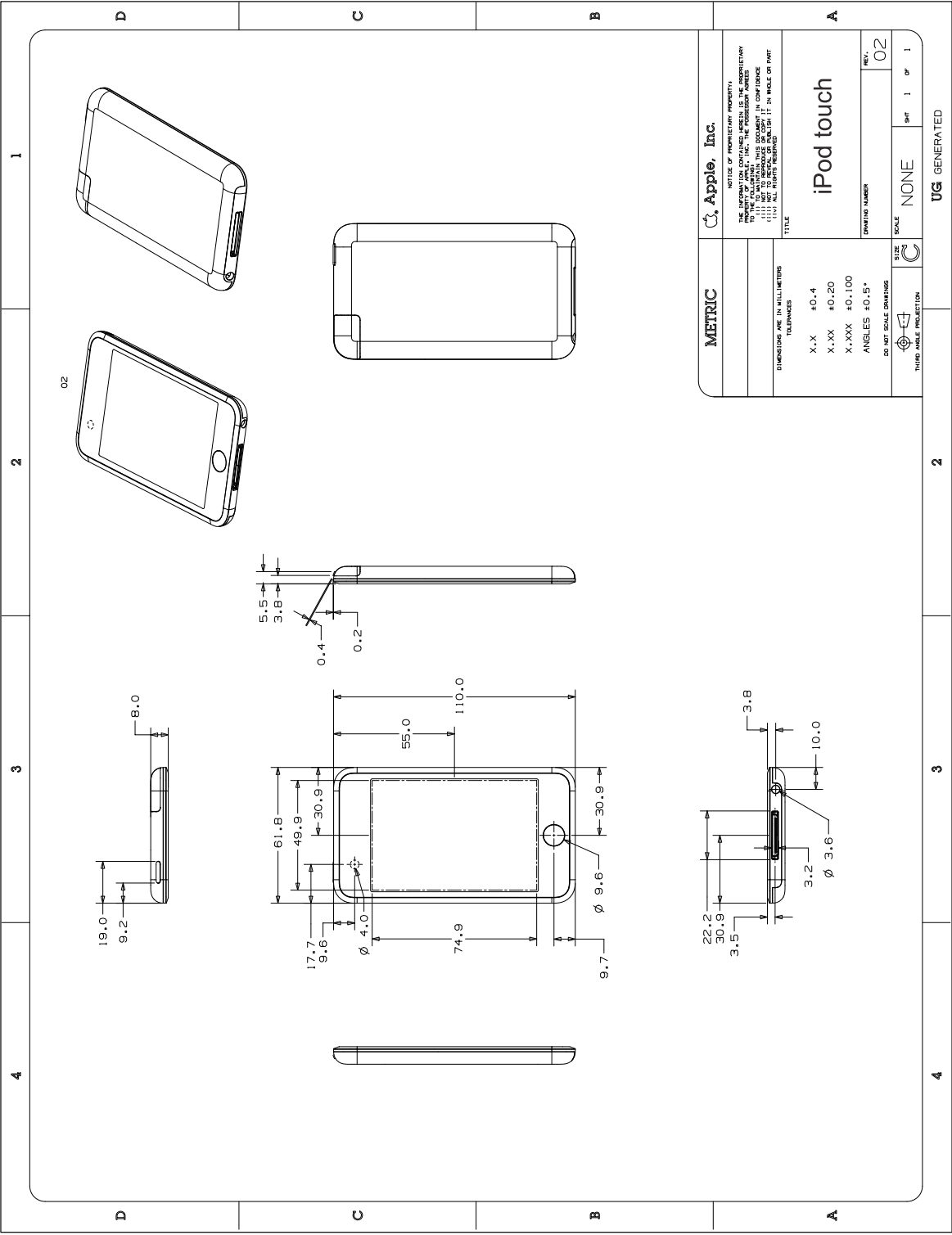
Figure 7-46 iPod touch 2nd gen. 8GB, 16GB, 32GB Dimensional Drawing





7.45 iPod touch

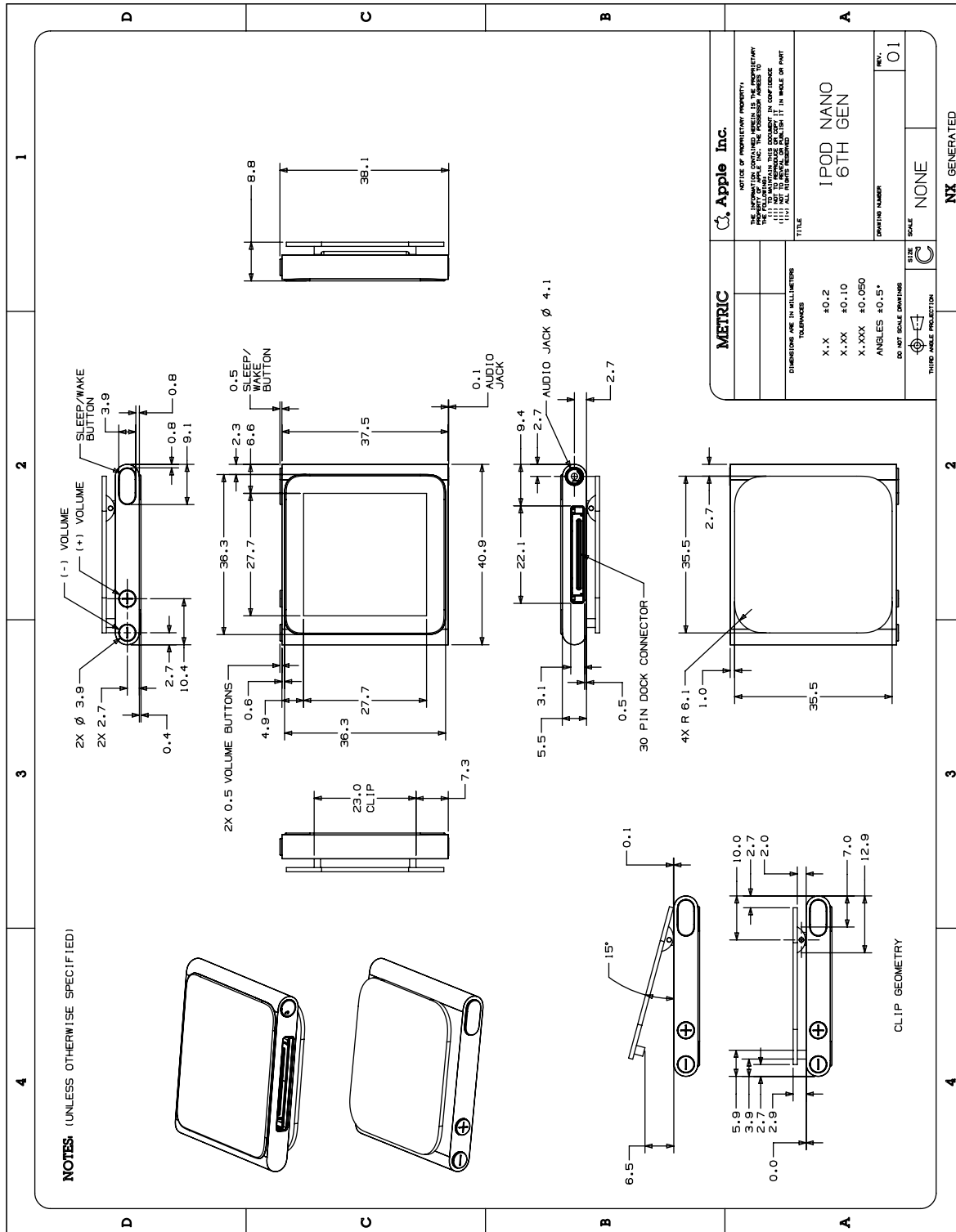
Figure 7-47 iPod touch Dimensional Drawing



[illegible]

## 7.47 iPod nano (6th generation)

Figure 7-49 iPod nano 6th gen. Dimensional Drawing



Technical drawing of the iPod Nano (5th Generation) showing front, back, and side views with dimensions in millimeters.

**Dimensions (mm):**

- Front View: 7.0, 4.4, 2.8, 3.1, 2.8, 6.2
- Back View: 38.7, 29.9, 19.3, 27.8, 46.8, 90.7, 20.0, 19.3, 27.1, 13.2, 27.1, 19.3
- Side View: 21.5, 23.1, 3.0, 3.1, 6.6

**Tolerances:**

Dimension	Tolerance
X.X	±0.4
X.XX	±0.20
X.XXX	±0.100

**Angles:** ±0.5°

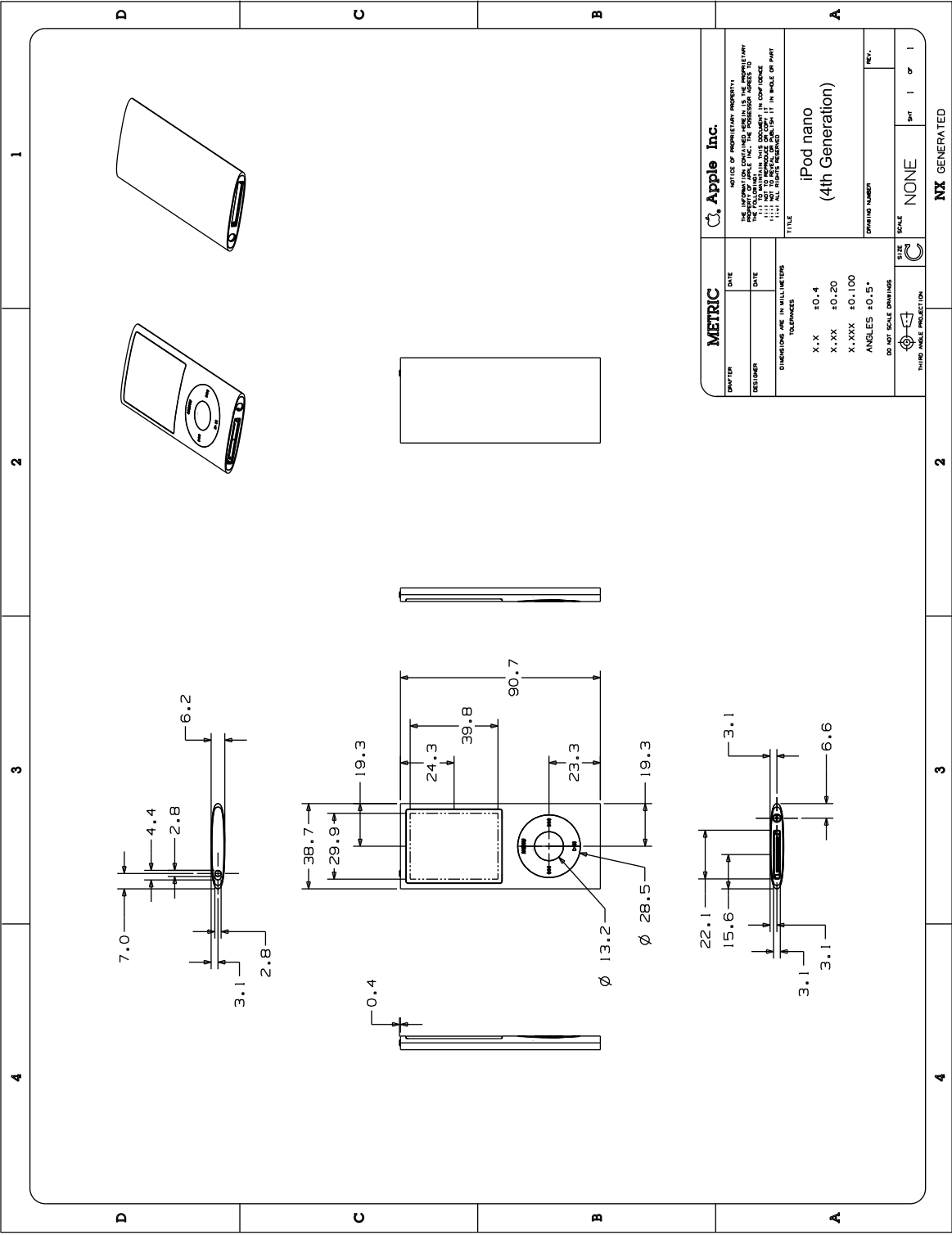
**Scale:** DO NOT SCALE DRAWINGS

**Title Block:**

METRIC		Apple Inc.	
DATE	DATE	NOTICE OF PROPRIETARY INFORMATION	
DESIGNER	DATE	THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY INFORMATION OF APPLE INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF APPLE INC. ALL RIGHTS RESERVED.	
DIMENSIONS ARE IN MILLIMETERS		TITLE	
TOLERANCES		SCALE	
X.X ±0.4		NONE	
X.XX ±0.20		NONE	
X.XXX ±0.100		NONE	
ANGLES ±0.5°		NONE	
DO NOT SCALE DRAWINGS		NONE	

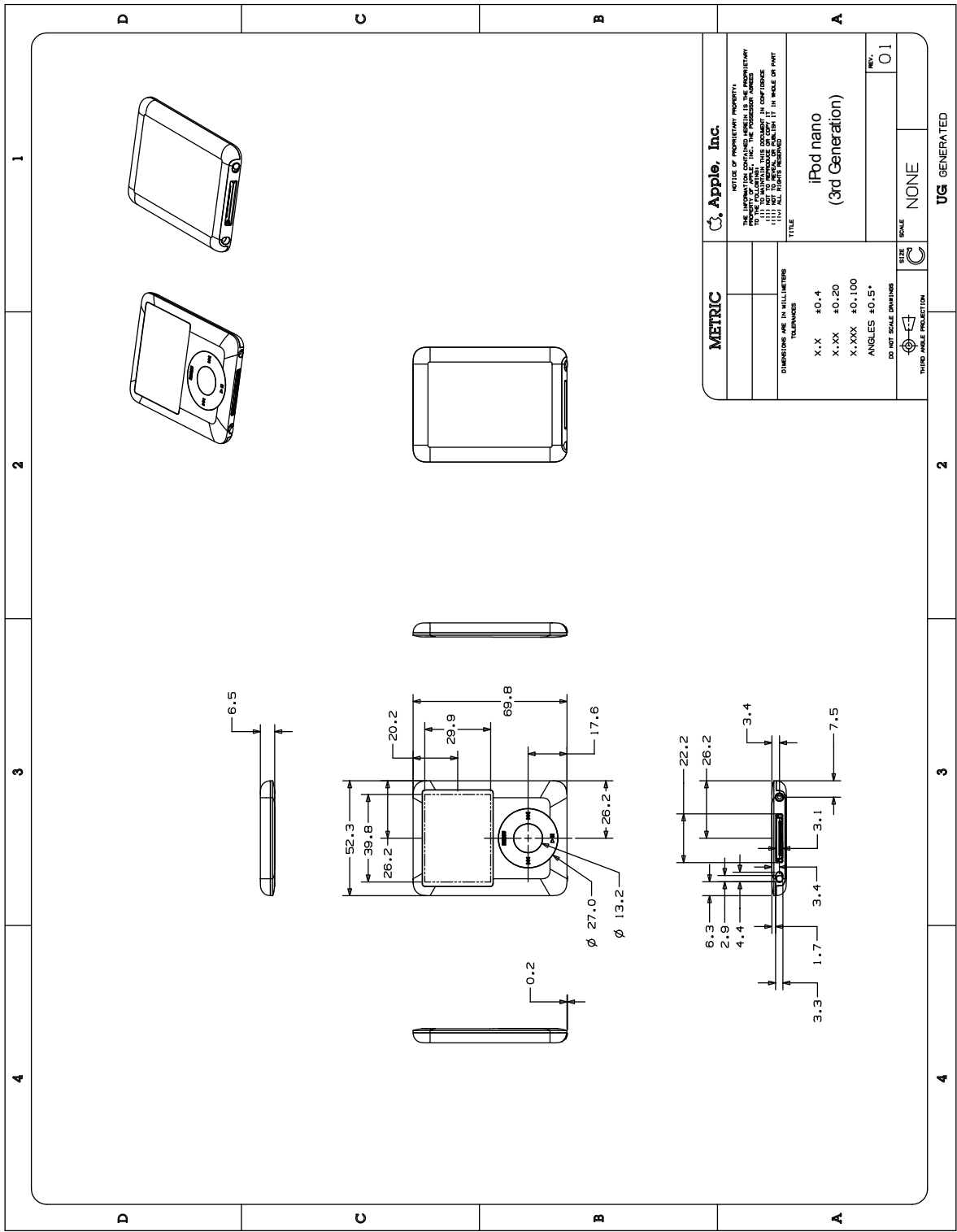
# 7.49 iPod nano (4th generation)

Figure 7-51 iPod nano 4th gen. Dimensional Drawing



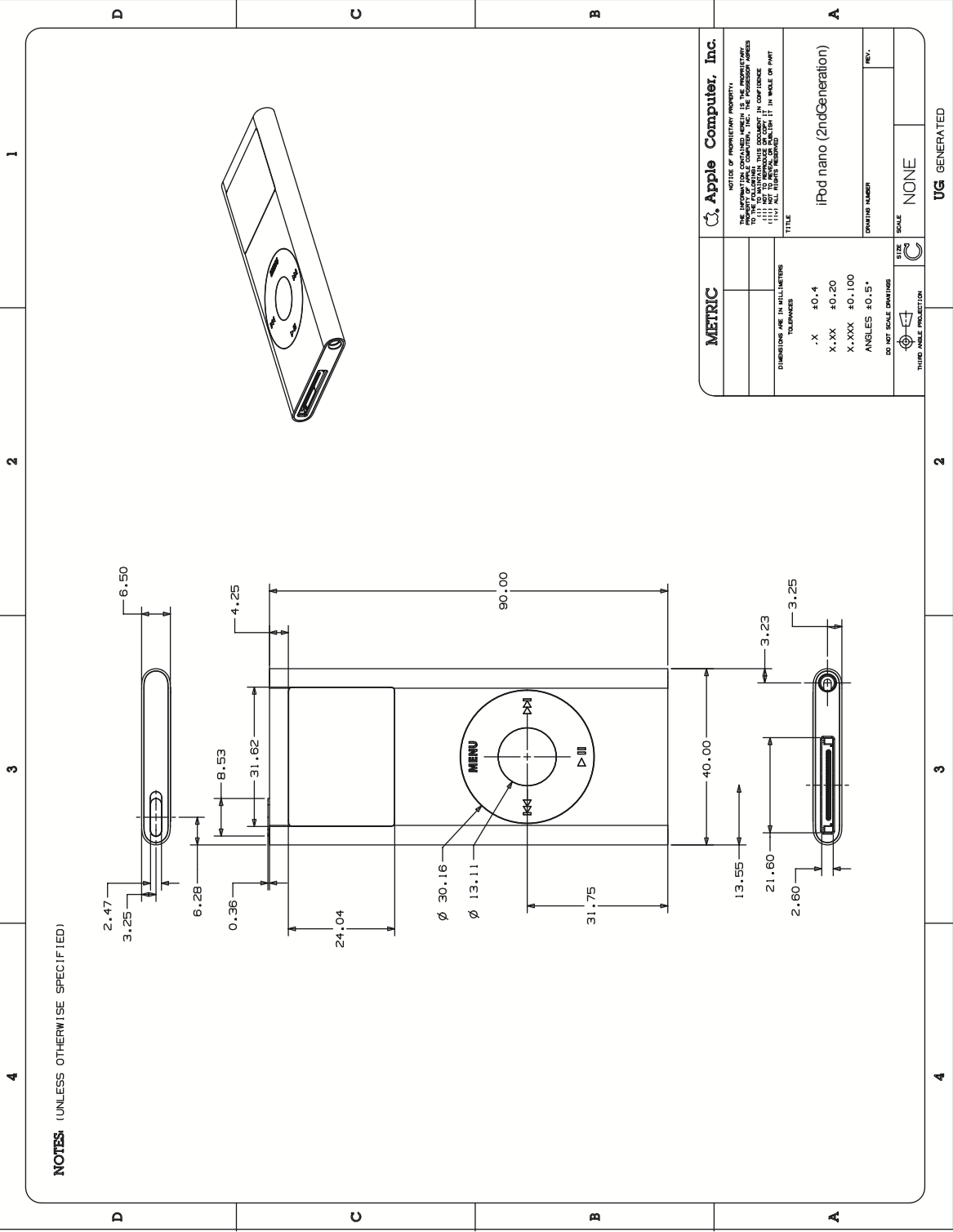
# 7.50 iPod nano (3rd generation)

Figure 7-52 iPod nano 3rd gen. Dimensional Drawing



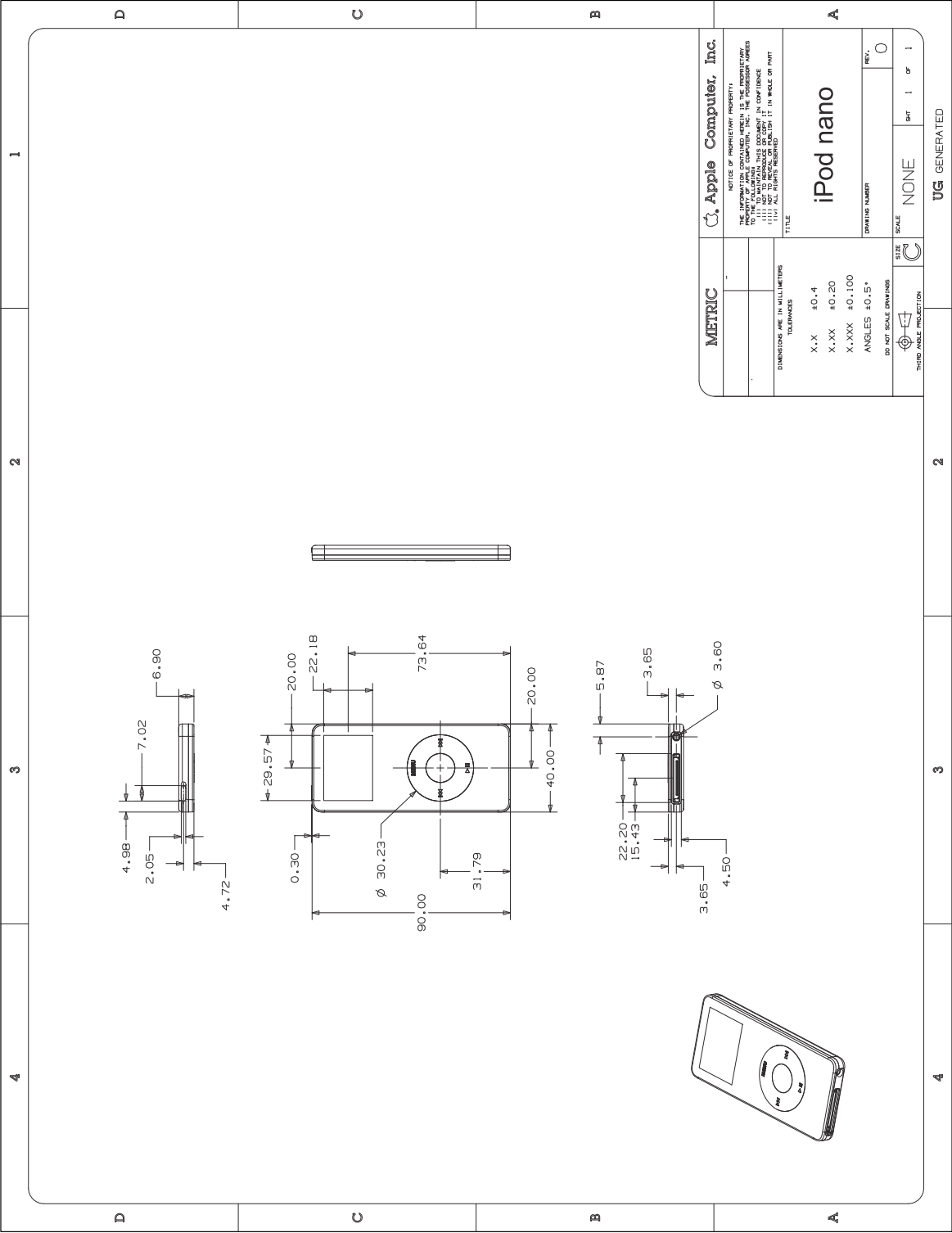
# 7.51 iPod nano (2nd generation)

Figure 7-53 iPod nano 2nd gen. Dimensional Drawing



7.52 iPod nano

Figure 7-54 iPod nano Dimensional Drawing

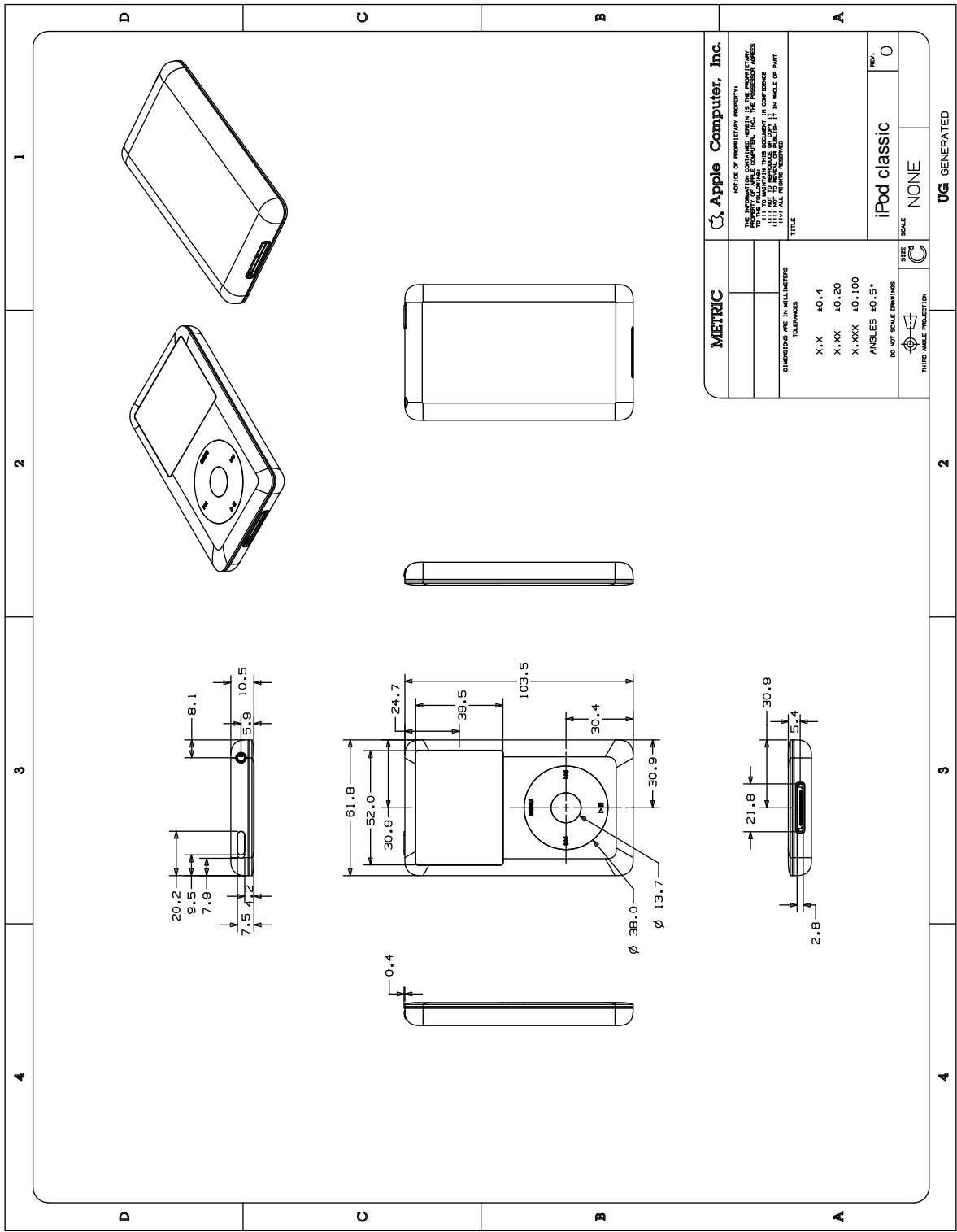






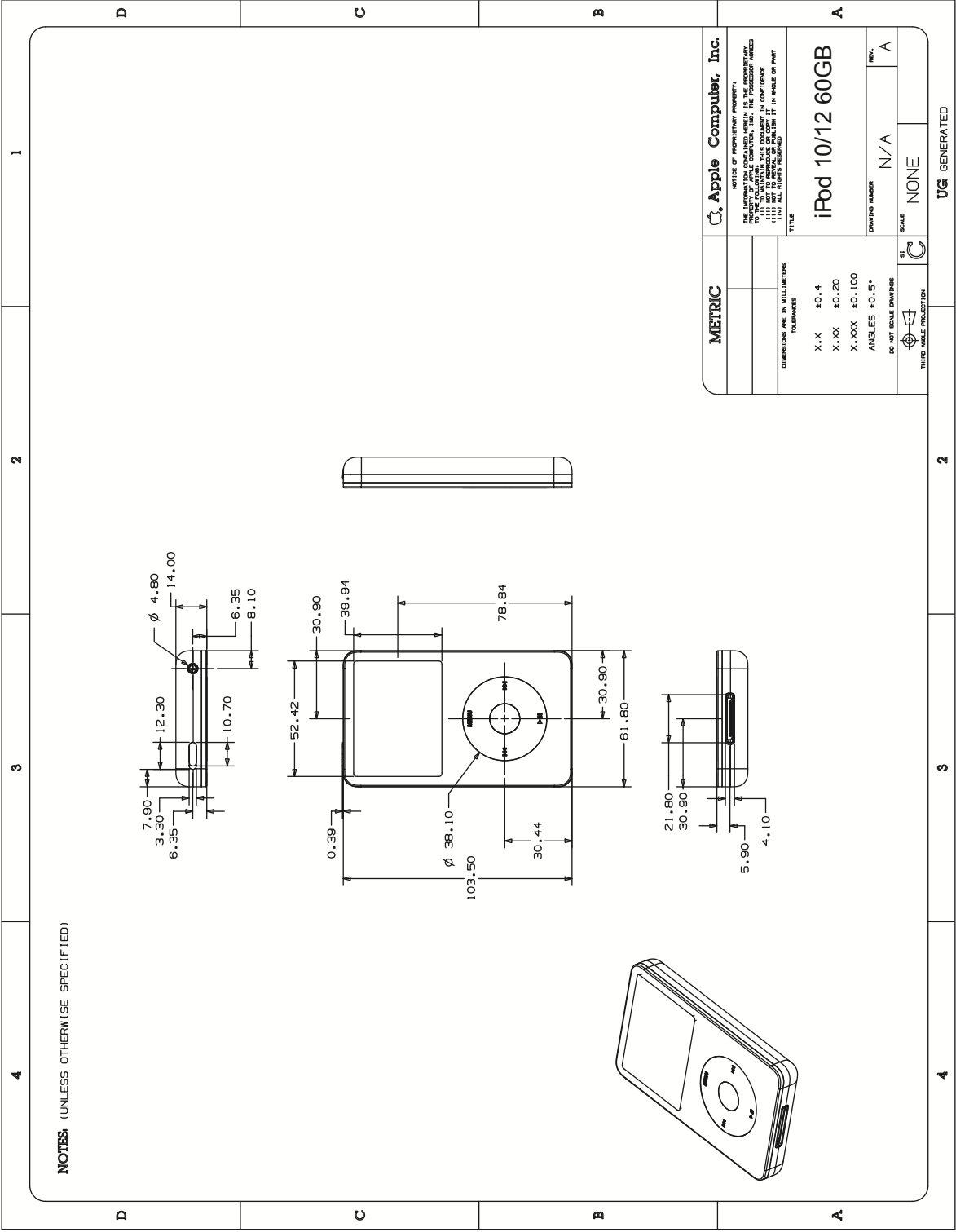
7.54 iPod classic 80GB

Figure 7-56 iPod classic 80GB Dimensional Drawing



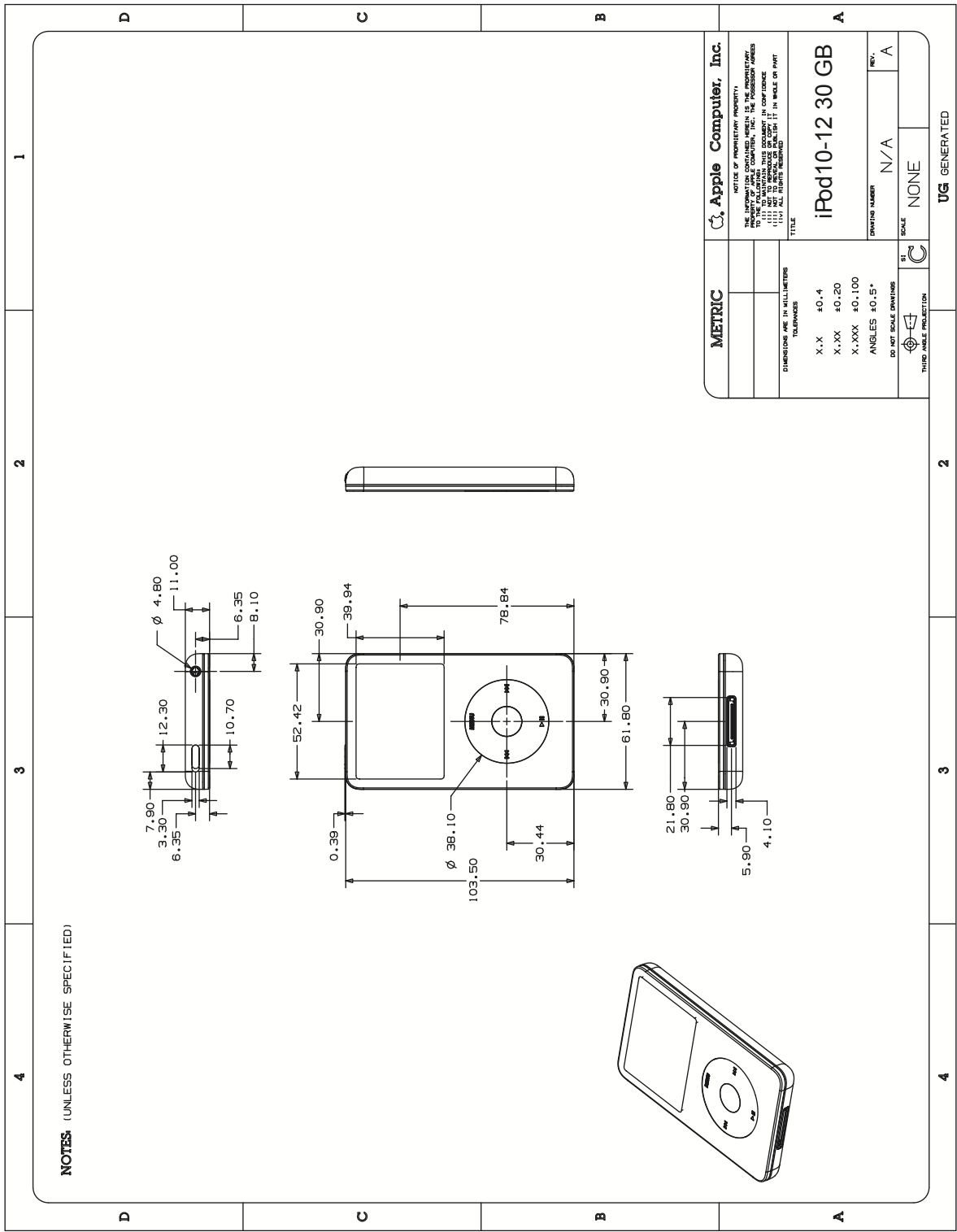
# 7.55 iPod (5th generation) 60GB/80GB

Figure 7-57 iPod 5th gen. 60GB/80GB Dimensional Drawing



7.56 iPod (5th generation) 30GB

Figure 7-58 iPod 5th gen. 30GB Dimensional Drawing



**NOTES:** (UNLESS OTHERWISE SPECIFIED)

**FRONT VIEW:** Dimensions include 3.20, 8.75, 6.40, 6.70, 4.80, 61.80, 0.34, 23.59, 71.04, 103.50, 34.00, 42.06, 14.60, 17.60, 6.41, 10.51, 4.10, 23.10.

**TOLERANCES:**

TOLERANCES	SIZE	SCALE
X.X ±0.0	1:1	1:1
X.XX ±0.00	1:1	1:1
X.XXX ±0.000	1:1	1:1
ANGLES ±0.0°	1:1	1:1

**APPLE COMPUTER, INC.**

**ACCESSORY DOCUMENT**

**DATE:** 1977

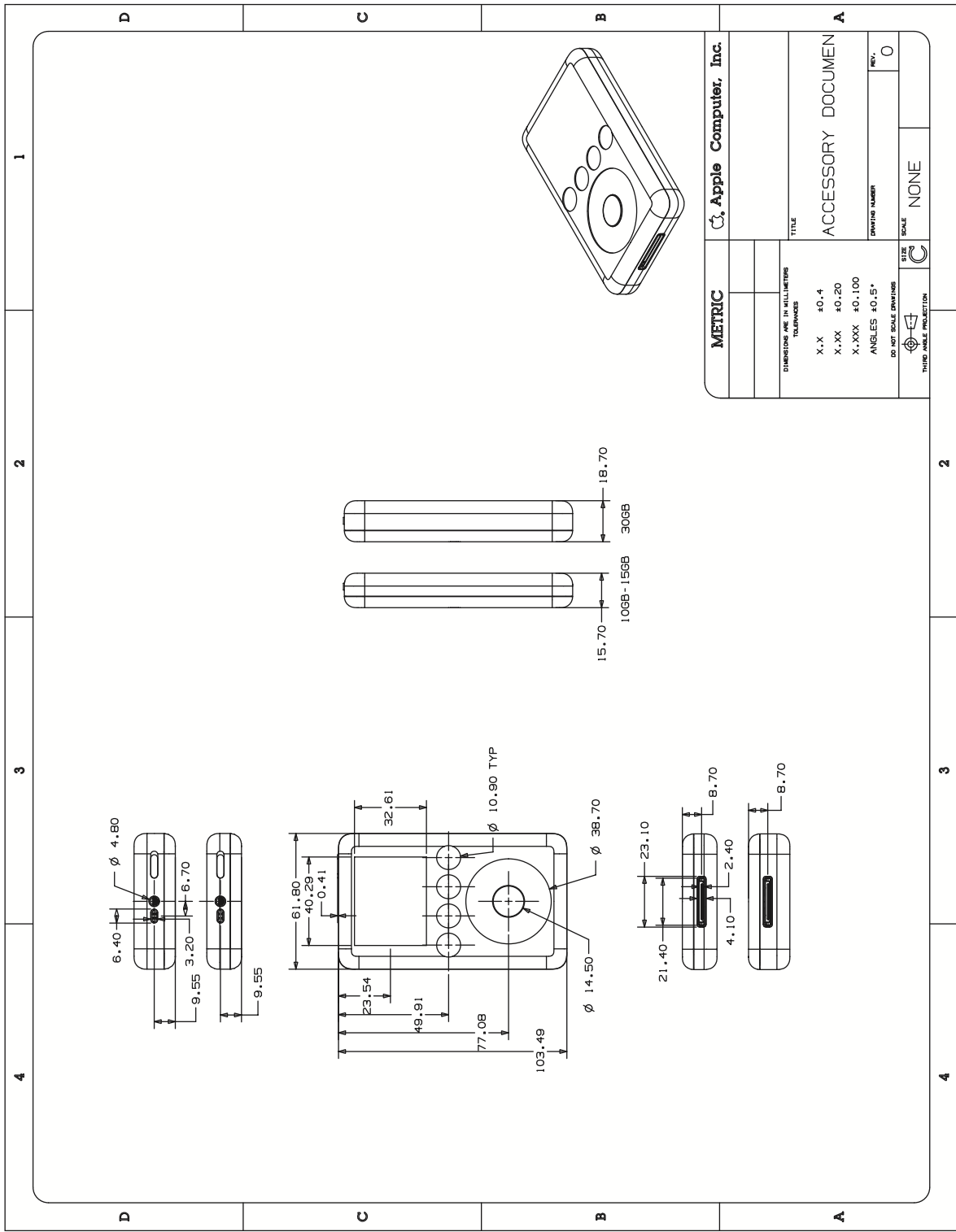
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**SCALE:** NONE

**THIRD ANGLE PROJECTION**

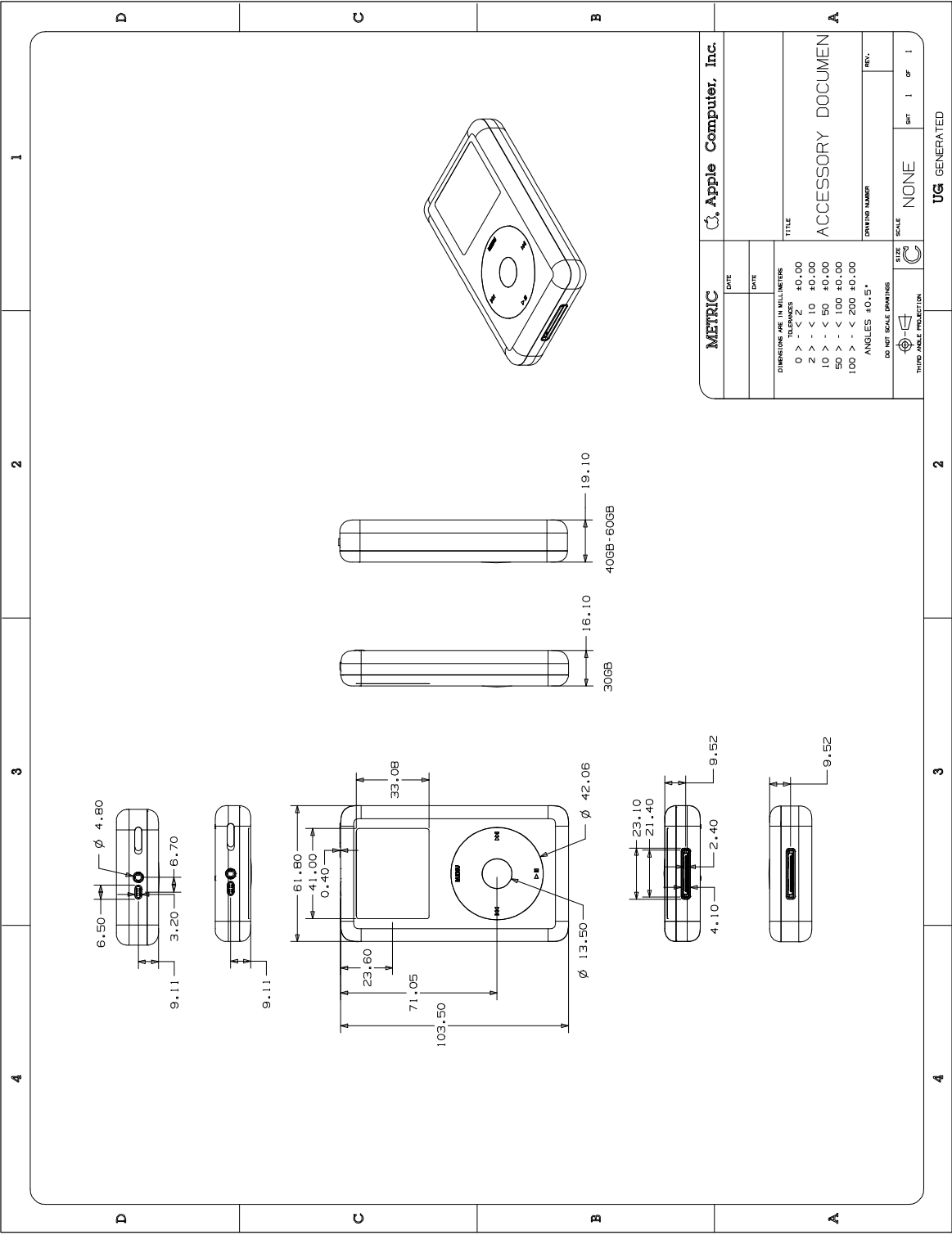
# 7.58 iPod (3rd generation)

Figure 7-60 iPod 3rd gen. Dimensional Drawing



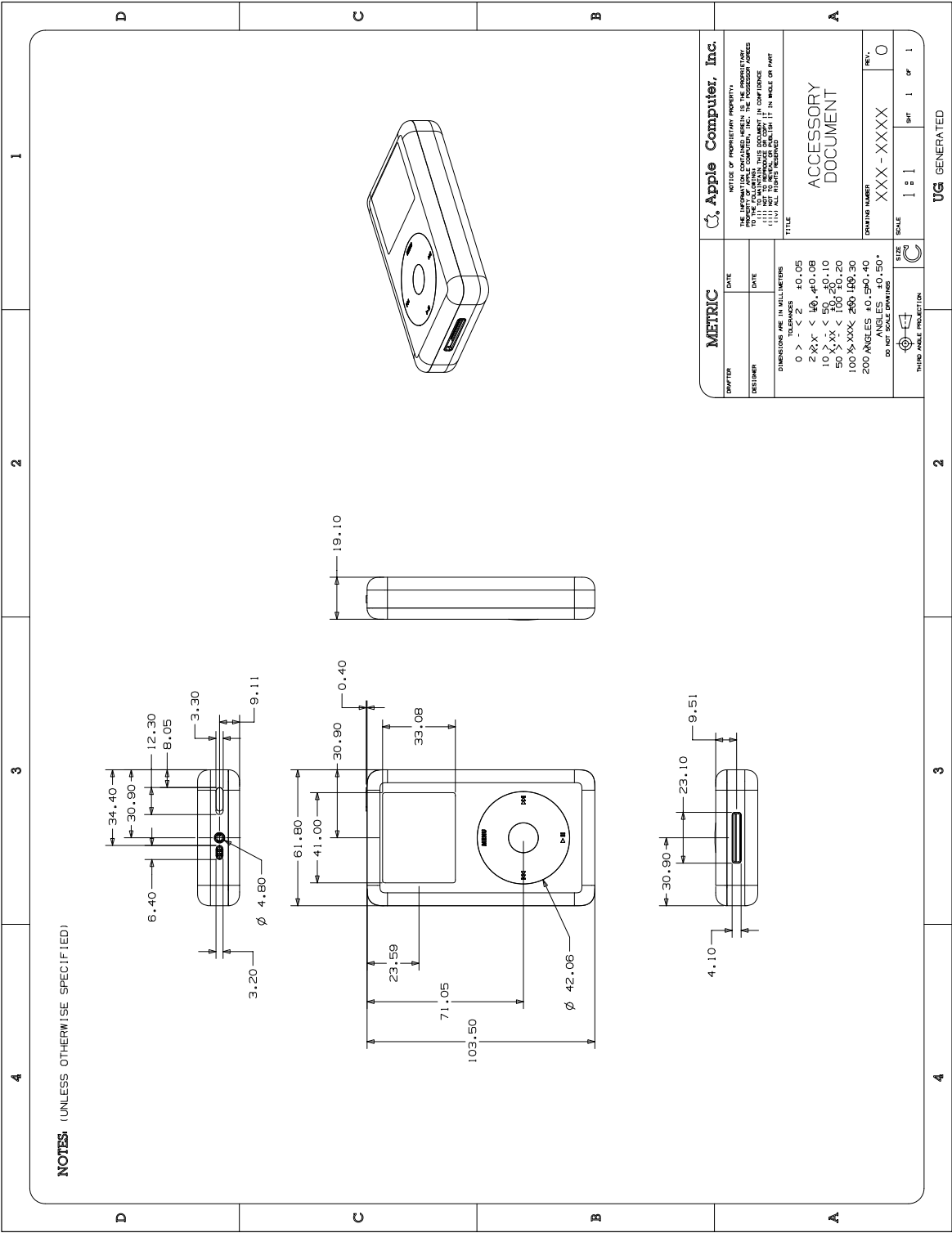
# 7.59 iPod photo 30GB/60GB

Figure 7-61 iPod photo 30/60GB Dimensional Drawing



# 7.60 iPod photo

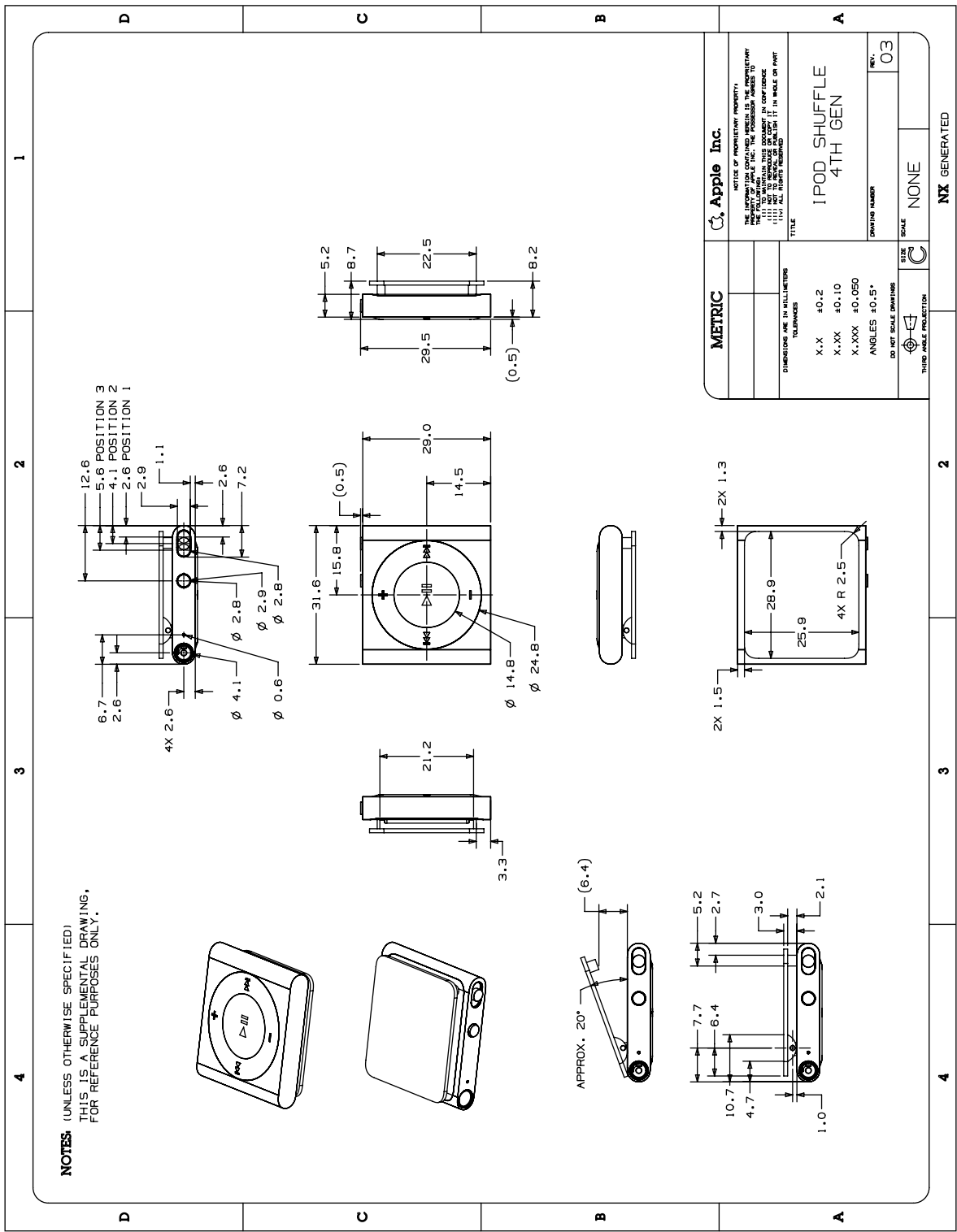
Figure 7-62 iPod photo Dimensional Drawing





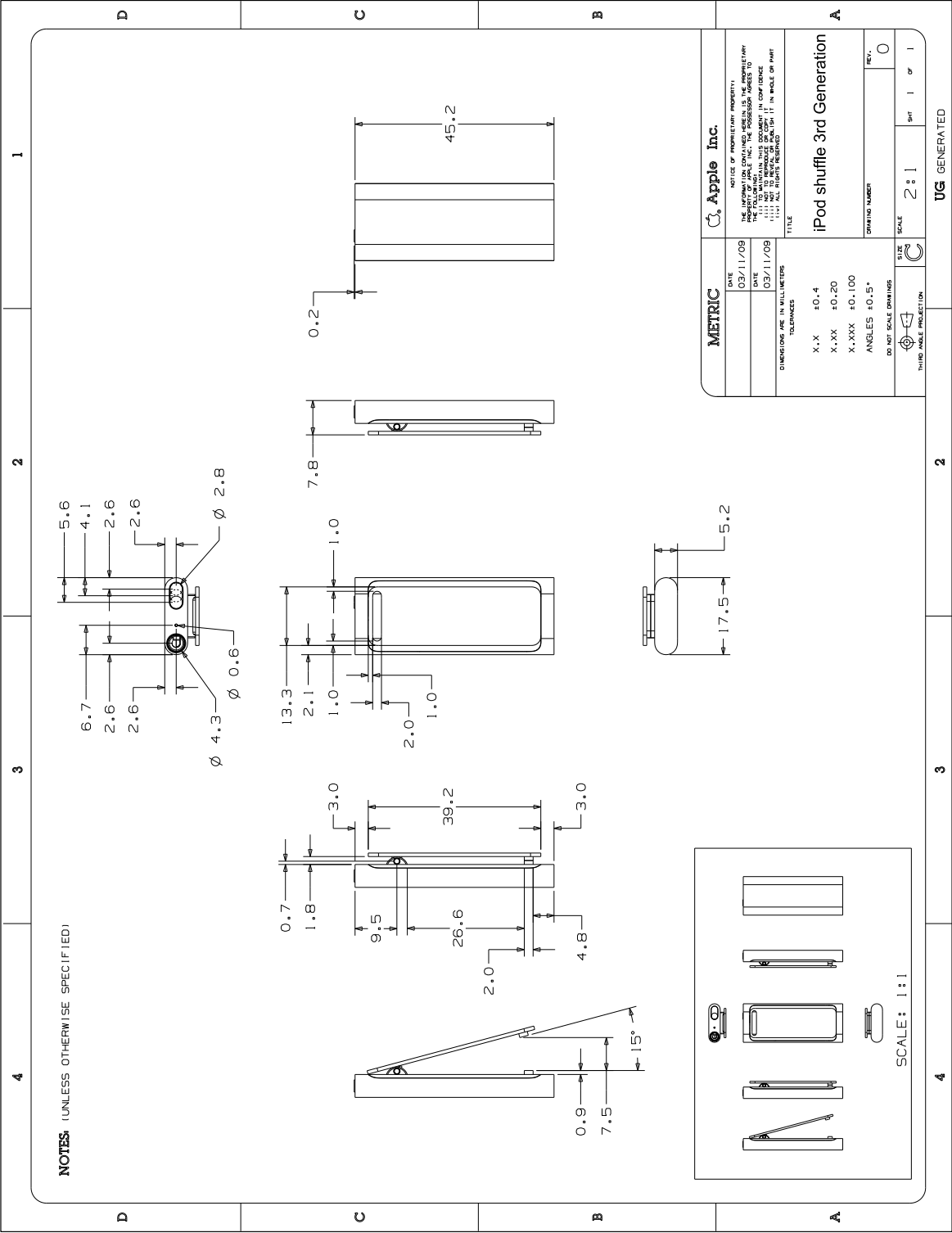
# 7.61 iPod shuffle (4th generation)

Figure 7-63 iPod shuffle 4th gen. Dimensional Drawing



# 7.62 iPod shuffle (3rd generation)

Figure 7-64 iPod shuffle 3rd gen. Dimensional Drawing





# 7.64 iPod shuffle

Figure 7-66 iPod shuffle Dimensional Drawing (1 of 2)

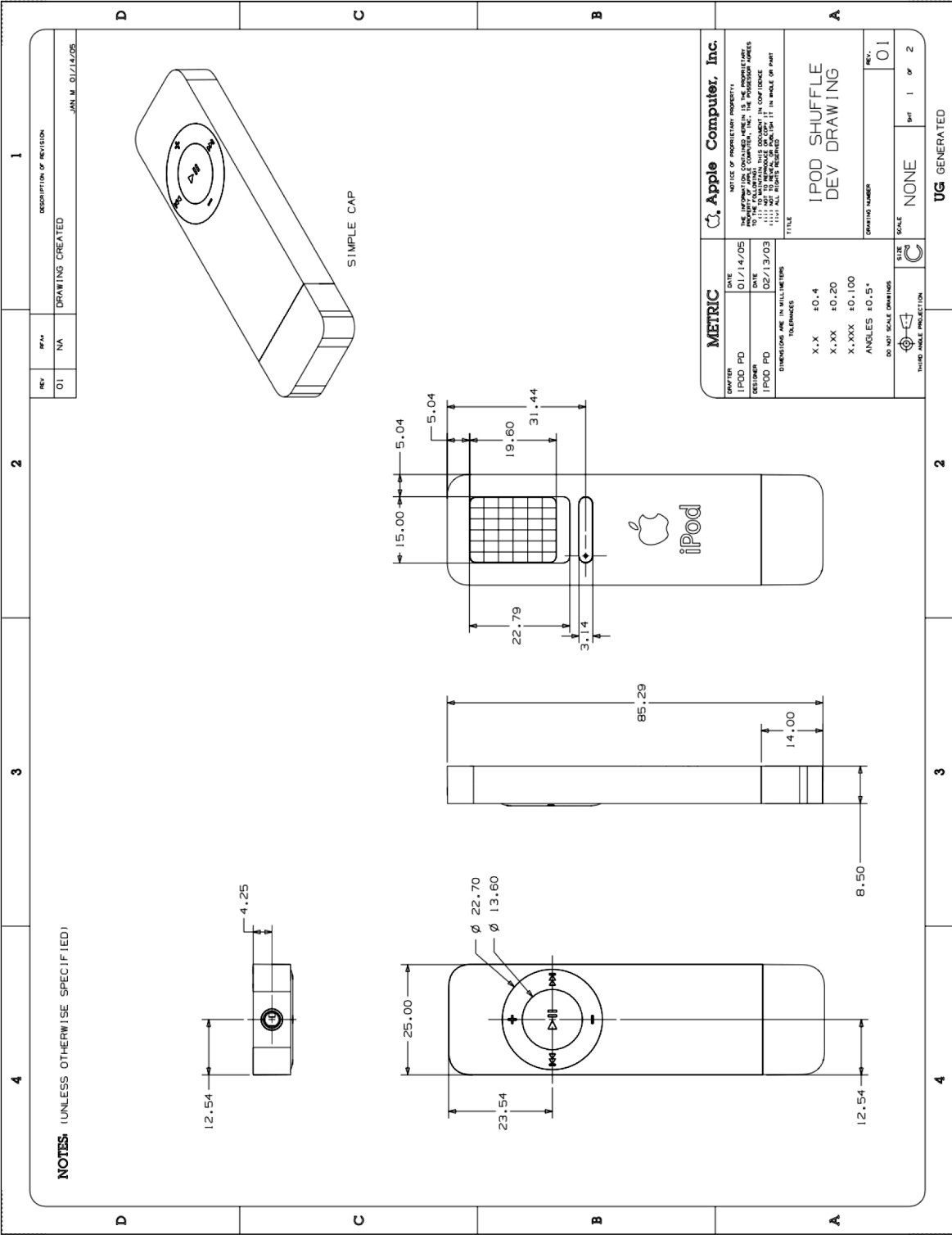
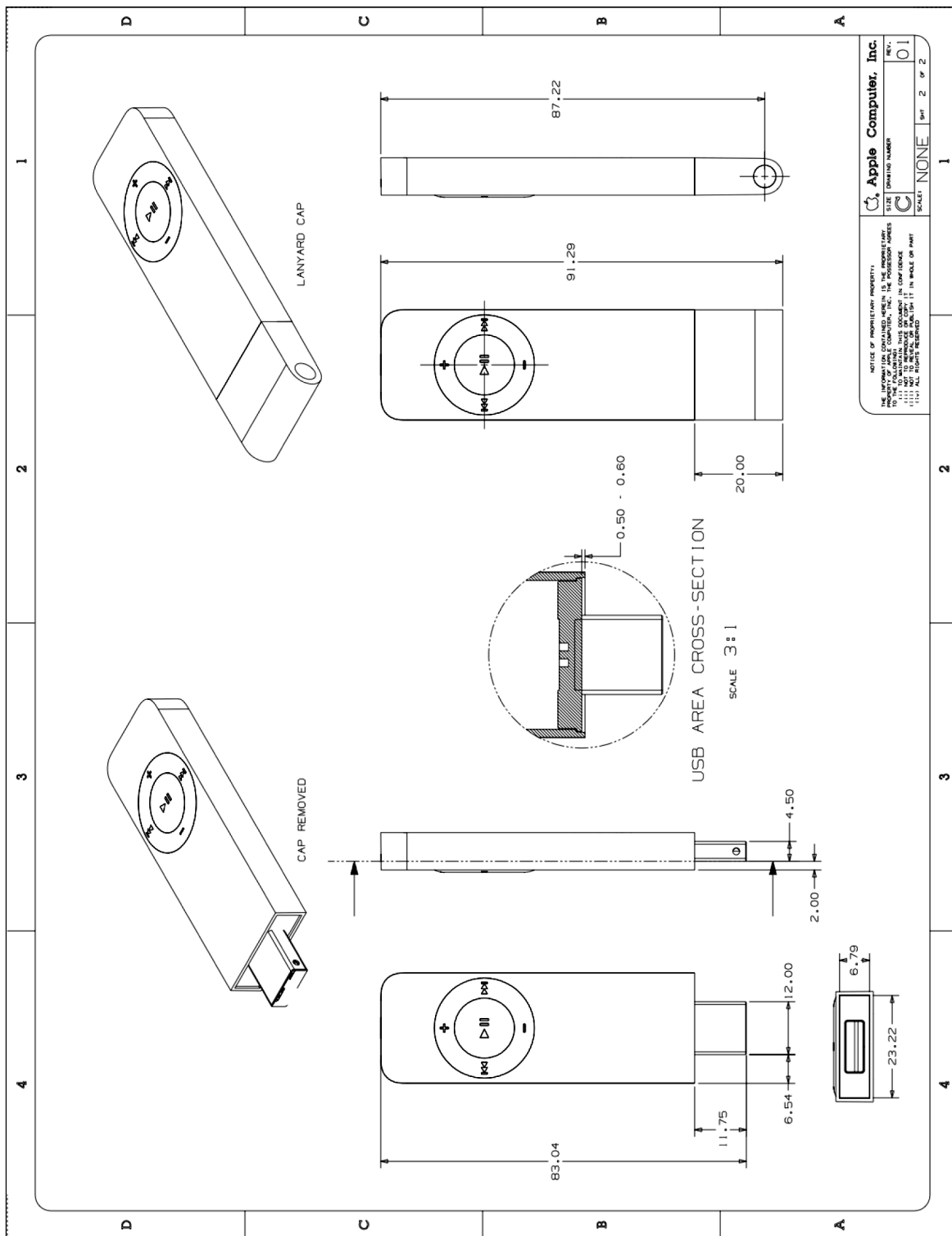
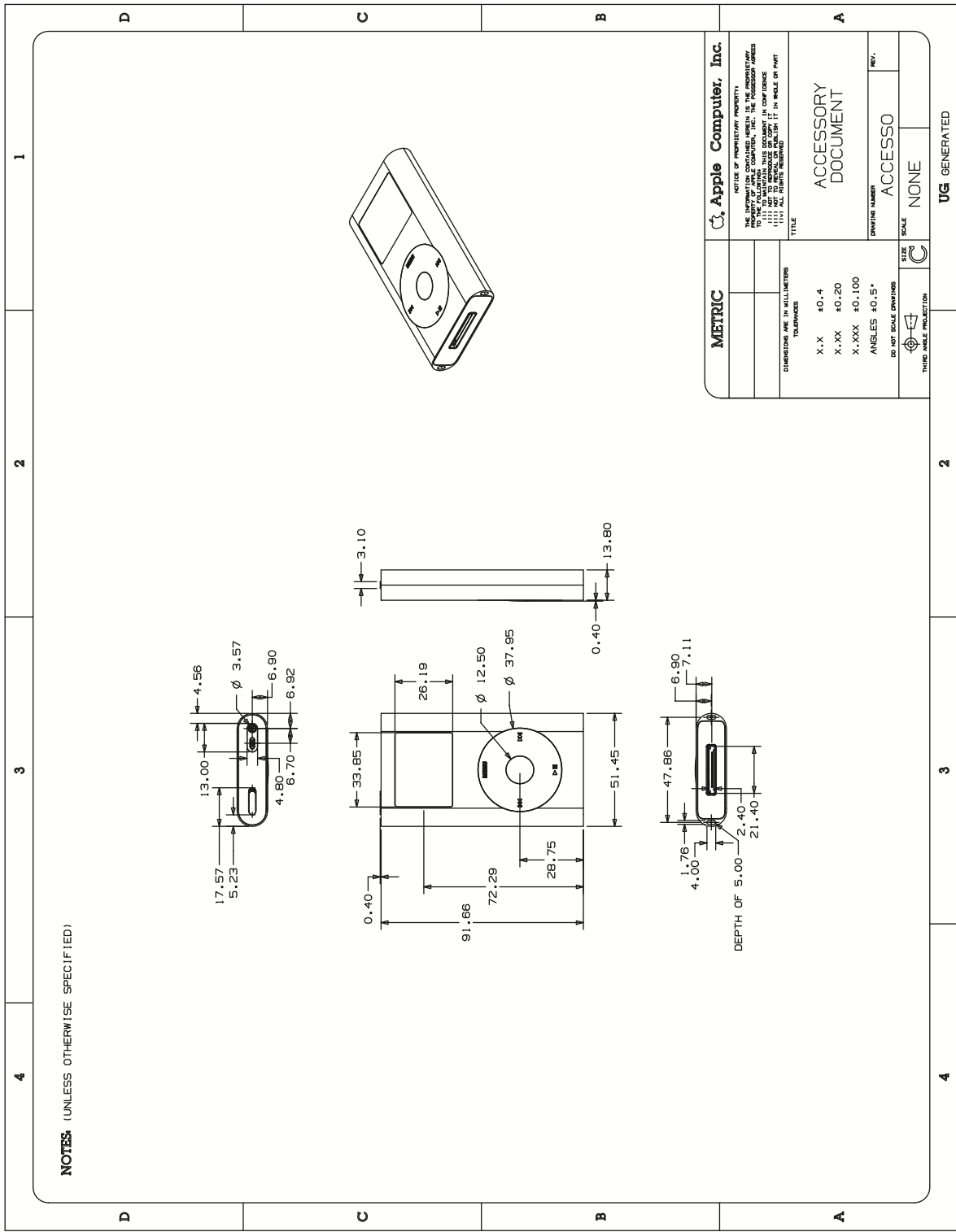


Figure 7-67 iPod shuffle Dimensional Drawing (2 of 2)



7.65 iPod mini

Figure 7-68 iPod mini Dimensional Drawing



# Revision History

This chapter describes changes to the Accessory Design Guidelines for Apple Devices from the previous revision.

This is the initial release of Accessory Design Guidelines for Apple Devices, which replaces Case Design Guidelines for Apple Devices, Revision R11.

## New Apple Devices

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- [iPhone 7](#) (page 40)

## Added Chapters

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- [Covers](#) (page 32)
- [Screen Overlays](#) (page 33)
- [Camera Attachments](#) (page 35)

## Changes

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- [Magnetic Interference](#) (page 11)
- [Radio Frequency \(RF\) Performance](#) (page 11)
  - [Materials and Coatings](#) (page 11)
  - [Antenna Keep-Out](#) (page 12)
  - [Over The Air \(OTA\)](#) (page 12)
  - [Near Field Communication \(NFC\)](#) (page 13)
- [Cases](#) (page 14)
  - [Access to Inputs and Interconnects](#) (page 14)

- [Touchscreen](#) (page 15)
- [Acoustics](#) (page 16)
- [Taptic Engine](#) (page 19)
- [Magnetic Interference](#) (page 19)
- [Home Button](#) (page 20)
- [Camera](#) (page 20)
- [Screen Overlays](#) (page 33)
  - [Product Design](#) (page 33)
  - [Edge Swipe Gestures](#) (page 33)
  - [Edge Press Gestures](#) (page 33)

## Test Procedure Changes

- [Required Apple Device Models](#) (page 23)
- [Product Design](#) (page 26)
- [Taptic Engine](#) (page 29)
- [Home Button Overlays](#) (page 30)